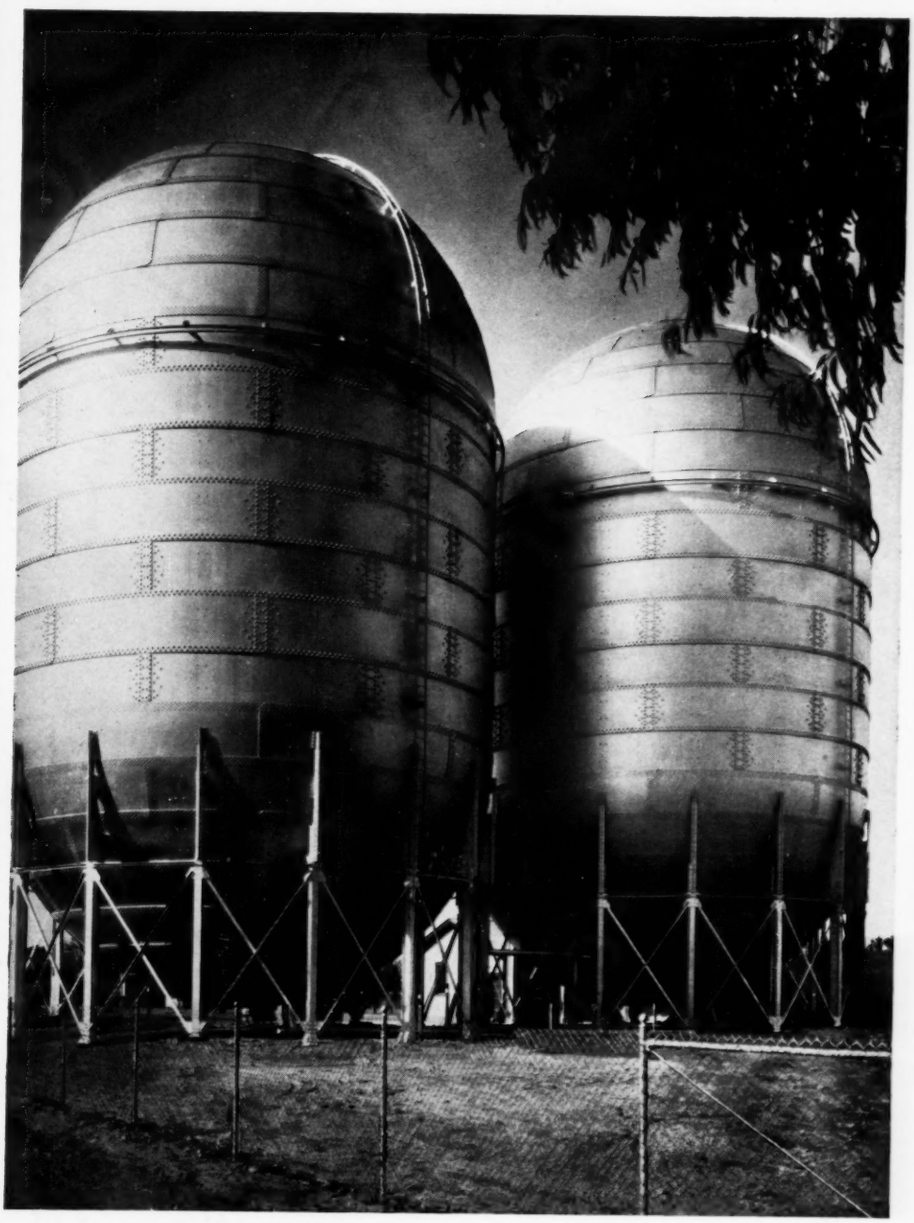
WESTERN GAS

July
1929



Vertical hemispherical high pressure holders of Southern Counties Gas Company at Pomona, Calif.,—combined capacity, 1,000,000 cu. ft. at 50-5 lbs. pressure

20 Cents
the Copy

A MONTHLY JOURNAL DEVOTED TO THE
WESTERN GAS & APPLIANCE INDUSTRIES

PRINT IN BINDING

the Service Cock that's *Lubricated*

moderate in price so easy to turn won't leak-won't stick

MERCO

In gas service, the success of Nordstrom Valves of larger types has been so phenomenal that Nordstrom engineers have perfected a smaller and more moderately priced valve—the Nordstrom Service Cock—which is designed for use on smaller lines such as curb and meter service and embodies the famous Nordstrom lubricating principle.

The Nordstrom Service Cock is leak-resistant because the patented "Sealdport" principle of lubrication seals the plug by hydraulic pressure. It can be easily turned, even after long periods of disuse, and is recommended for lines not exceeding 50 pounds pressure. Made in sizes ranging from ¾″ to 1½″. Obtainable in plain and lock wing types.

For details, ask for Catalog No. 6.

Special "Merco" Lubricants

We have developed special "Merco" Lubricants for Service Cock use. These lubricants are prepared in stick form for convenience in lubricating.

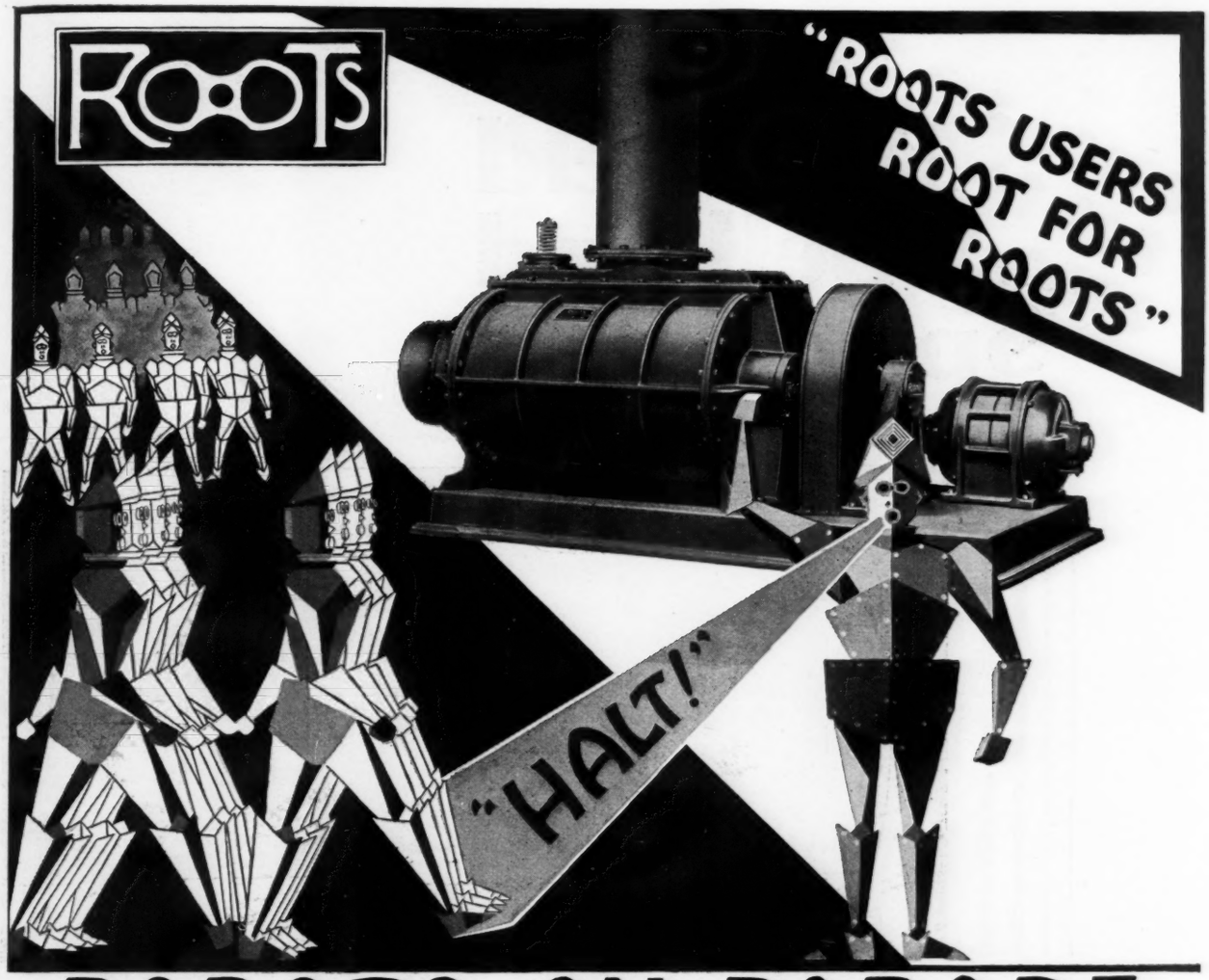
Merco Nordstrom Valve Company
Subsidiary of The Merrill Company
Engineers - - - - Manufacturers

BOSTON—184 Boylston St.
BUFFALO—Genesee Bldg.
CHICAGO—176 W. Adams St.
DALLAS—Magnolia Bldg.
DETROIT—2842 W. Grand Blvd.
HOUSTON—Petroleum Bldg.
LOS ANGELES—556 S. San Pedro St.
NEW ORLEANS—Masonic Temple Bldg.
NEW YORK—11 W. 42nd St.
PITTSBURGH—Clark Bldg.
SAN FRANCISCO—343 Sansome St.
SEATTLE—Colman Bldg.

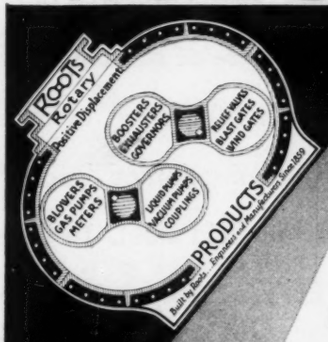
Agencies in Principal Cities

FACTORIES: Oakland, California and Belleville New Jersey
Canadian Manufacturers—PEACOCK BROS., Ltd., Montreal, Cobalt, Winnipeg, Vancouver
ENGLAND—Audley Engineering Co., Ltd., Newport, Shropshire

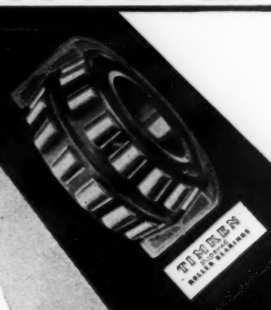
Nordstrom *Service Cocks*



ROBOTS ON PARADE



As one good piece of machinery to another the superintendent of the future halts the new shift to let them appreciate an example of mechanical efficiency and super-performance — The Roots Blower. See them in our catalog.



The P.H. & F.M. ROOTS CO.

CHICAGO
Peoples Gas Building

CONNERSVILLE, INDIANA

NEW YORK
120 Liberty Street

Western Representative: SUTOR & CO.,
2008 East Slauson Ave. Los Angeles, California

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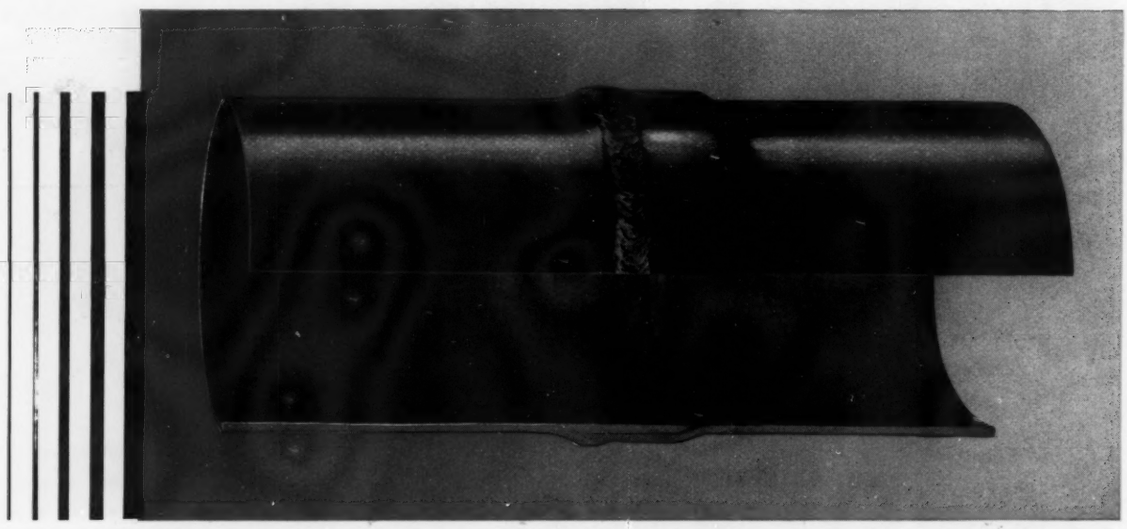
The SMITHWeld Bell and Spigot Joint



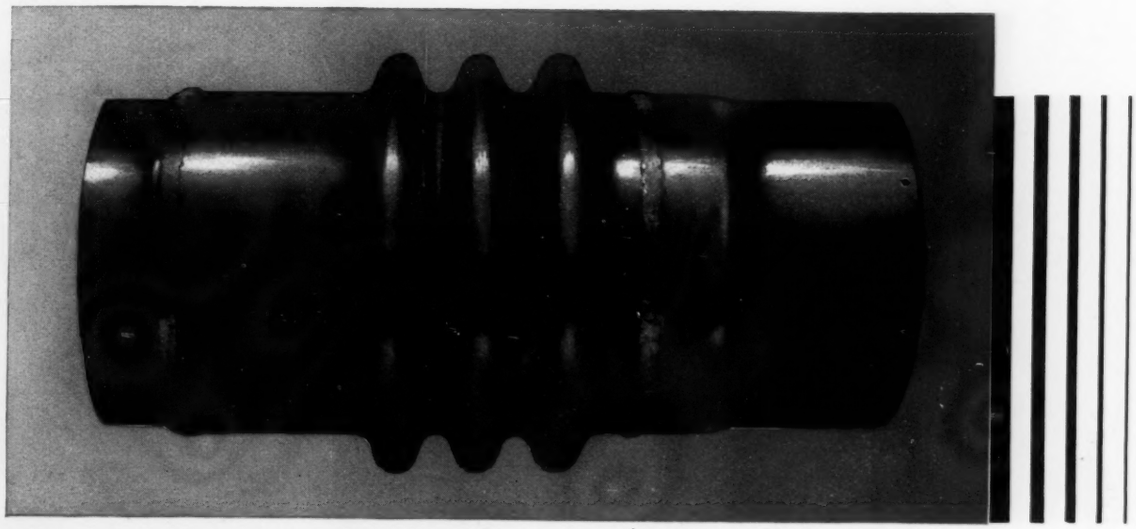
A new joint for Pipe Line Construction that offers many advantages including: ease of stabbing; correct stabbing distance; weld in tension or compression—never in shear; elimination of "icicles"; 100% joint efficiency in the field weld. In combination with the SMITHWeld Expansion Joint it makes all welded construction the ideal construction for pipe lines.

SMITHWELDED

A. O. SMITH CORPORATION

Oil and Gas Field Products Division

The SMITHWeld Expansion Joint



Another New Joint for Pipe Line Construction that overcomes the oldest and most persistent trouble encountered in large diameter all-welded lines—that is, the tendency to part or buckle with contraction and expansion.

The design and the manner of application of these joints to steel pipe and the methods of their manufacture in steel are decidedly new.

LINE PIPE

General Offices: Milwaukee, Wisconsin

District Offices at: New York—Tulsa—Houston—Los Angeles

BITURINE Enamel is rendered absolutely impervious to corrosive elements and is safeguarded against electrical break down by the high quality ingredients used in its manufacture, and which have been chosen for their remarkable resistance, lesser permeability, greater ductility, and greater tensile strength, all blended from over twenty years of experience and experimentation in the manufacture of protective coatings.

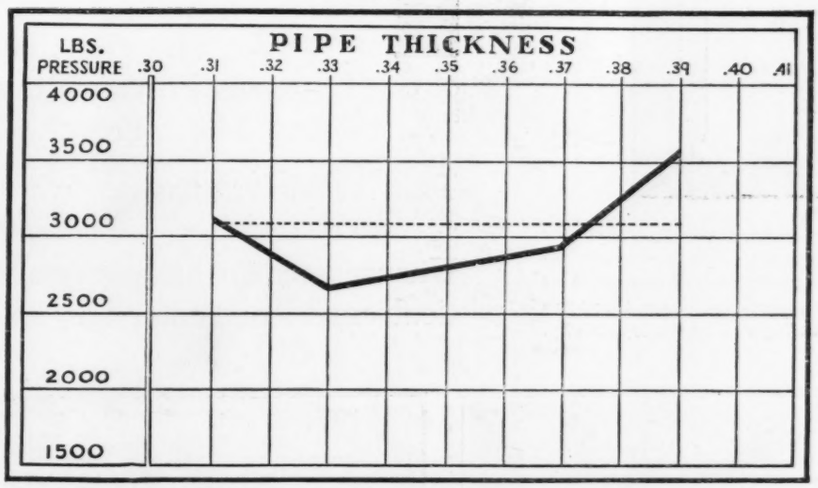
As a result of this meticulous care Biturine Enamel has been specified again and again on important pipe line installations where complete protection and not price per barrel of coating has been the deciding factor.

HILL, HUBBELL & COMPANY

Division
General Paint Corporation

Manufacturers of Highest Grade Oil Industry Paints and Pipe Line Coatings
General Offices: SAN FRANCISCO
Mid-Continent Factory: TULSA
Offices:
SAN FRANCISCO - TULSA - NEW YORK - CHICAGO - LOS ANGELES - HOUSTON - PORTLAND - SEATTLE - SPOKANE

*deLavaud pipe shows
an average internal resistance
of 3090 lbs. per square inch



* The above graph is based on tests performed by a well-known Testing Laboratory. These tests show that deLavaud Pipe is over 25% stronger than good pit cast pipe. The dotted line represents the average bursting pressure of 6" deLavaud pipe of representative thicknesses.

THE superior strength of deLavaud pipe becomes more surprising when one considers the increased carrying capacity which this pipe offers. On the graph shown above, you will note that the average thickness of the deLavaud pipe tested is thirty-five one-hundredths of an inch. Yet, this pipe exceeds by 25% the strength of any pit cast pipe designed for equal working pressures.

deLavaud pipe is made by pouring molten metal into a cylindrical mould which is revolving at a high rate of speed. Centrifugal force holds the metal against the mould and drives out impurities *with a force 40 times greater than gravity.*

Therefore, deLavaud cast iron has a dense close-grained structure and freedom from gas bubbles and impurities. In addition, the quick cooling of the surface metal in the deLavaud water-cooled mould helps bring about the finely divided condition of the graphite in the iron.

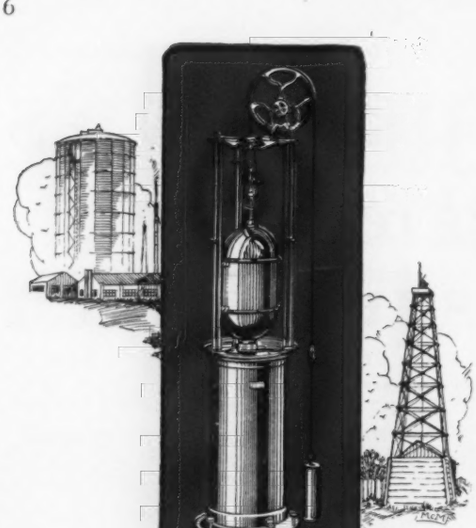
So remarkable have been the results of strength tests conducted on deLavaud Pipe that it is difficult to describe them without using extravagant-sounding comparisons. Suffice it to say that the great strength of deLavaud has never been equalled by any pit cast pipe.

Let us send you further facts and figures about deLavaud Pipe. Our free, illustrated handbook gives detailed information regarding types of joints and dimension tables. Write for your copy today.

Cast iron pipe made by this Company bears the "Q-check" trademark of The Cast Iron Pipe Research Association.

United States Pipe
and Foundry Co., Burlington, New Jersey

Sales Offices: New York, Philadelphia, Pittsburgh, Cleveland, Buffalo, Chicago, Dallas, Birmingham, Kansas City, Minneapolis, Seattle, San Francisco, Los Angeles

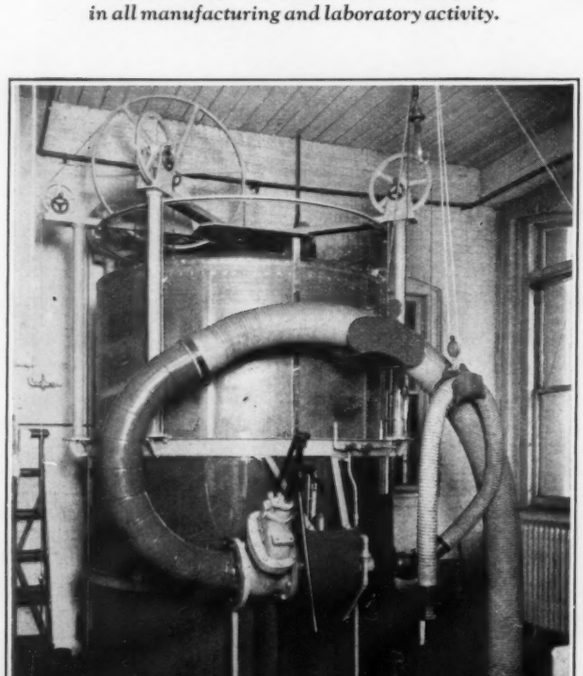


The Cubic Foot Bottle—certified for accuracy by the U. S. Bureau of Standards—symbolizes the enduring standards of measurement maintained by American Meter Company in all manufacturing and laboratory activity.

The Higher Standard

FOR proof of the Correctness of Gas Meter Registration, the vast majority of Gas Company Proving Rooms rely on the "American" Meter Prover.

This instrument has deservedly become the accepted standard for accurate proof:—Unsurpassed quality, craftsmanship and practical experience enter into its manufacture.



A 100-foot Meter Prover constructed by D. McDonald & Co. This prover is particularly adapted to the testing of large capacity meters.

OTHER APPARATUS RECOGNIZED AS STANDARD

Meter Testers — Hydro Pneumatic

Wet Test Meters

Specific Gravity Apparatus

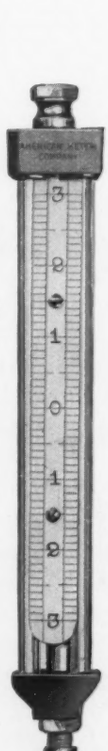
Sulphur and Ammonia Test —Referees' Apparatus

Hydrogen Sulphide Test

Siphon Gauges

Thermometers

Laboratory Governors or Regulators

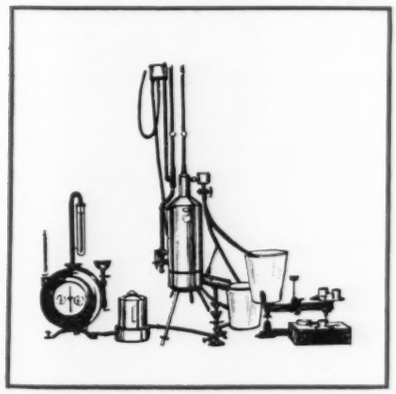


New Improved Siphon Gauge 4, 6, 8, 10, 12 inch sizes.

In Proving Room Equipment

The Apparatus Department of American Meter Company factories is equipped to furnish Meter Provers in any required size. Their accuracy is vouched for by calibration with the Cubic Foot Bottle certified by the U. S. Bureau of Standards.

Prompt service, intelligent cooperation and complete information is at all times available.



The Improved American Calorimeter

This thoroughly accredited instrument is unsurpassed for determining accurately the calorific values of gas. In the many laboratories where the American Calorimeter is being used, it is prized as an indispensible part of accurate equipment.

STANDARD SIZES WITH BRASS TANK AND COPPER BELL

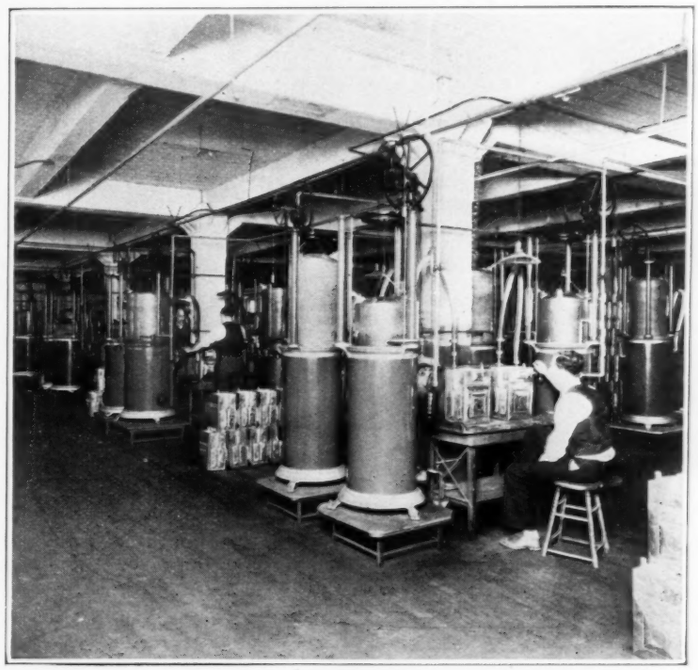
2-foot prover (No. AL 12)
5-foot prover (No. AL 13)
10-foot prover (No. AL 14)
20-foot prover (No. AL 15)

Other required sizes are manufactured on order—including the 100-foot prover illustrated.

AMERICAN METER COMPANY
JOHN J. GRIFFIN & COMPANY
HELME & McILHENNY
MARYLAND METER WORKS
D. McDONALD & COMPANY
METRIC METAL WORKS
NATHANIEL TUFTS METER WORKS
PACIFIC METER WORKS

AMERICAN METER CO. MEASUREMENT ENGINEERS CUBIC FEET

Literature and other information available on request.



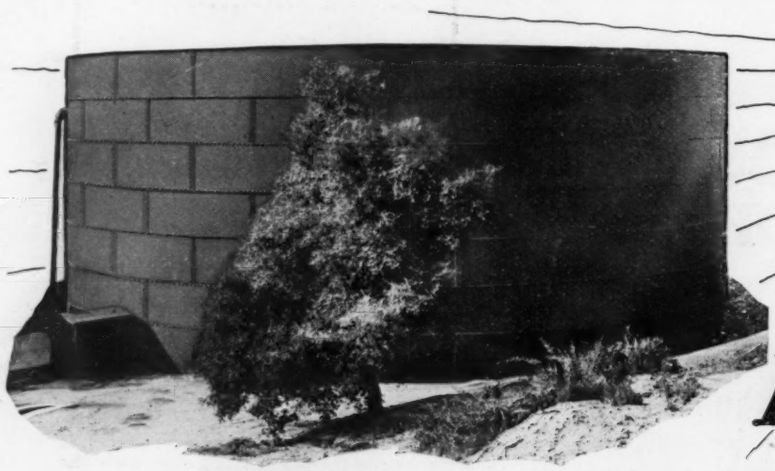
Proving room equipped with 23 standard American Meter Company provers in 2-foot, 5-foot and 10-foot sizes.

PACIFIC METER WORKS

of AMERICAN METER COMPANY, Incorporated
Specializing in the Manufacture of Gas Meters and Allied Apparatus

San Francisco Established 1901 Los Angeles

Northwestern Representatives **Portland** **Northwest Gas and Electric Equipment Company**



Well Protected after 20 months of *Sun and Fog!*

THE above picture is from an unretouched photograph of an 80,000 gallon tank of the Los Angeles Department of Water and Power, taken 20 months after coating with McEverlast No. 99. At this time, the inspecting engineer said: "Tank shows no signs of corrosion—protective coating looks good for many more years."

This tank is subject to the worst kind of weather—blistering hot days and cool, foggy nights—causing a maximum expansion and contraction that only a tough coating such as McEverlast could withstand. Even the color hasn't started to fade!

Remarkable Life

At the time of inspection strips of this coating, cut from the tank, adhered to paper on which they were laid. More than two months later these paint strips could be curled without cracking, showing the remarkable life of the product. Pipes protected with the same product still show no signs of corrosion after ten years of continuous subjection to salt water with the rise and fall of the tide.

Protective Coatings for All Exposed and Underground Metal Surfaces

Wherever there's a need for protection against corrosion or electrolysis—above or below ground — McEverlast products meet the requirements. A request on your letterhead will bring you a copy of our new booklet, "Protecting Pipe-Lines and Exposed Metal Surfaces with McEverlast Protective Coatings."

McEVERLAST, INC.
[TM. REG.]

111 West Seventh St., Los Angeles, Calif.

Branches

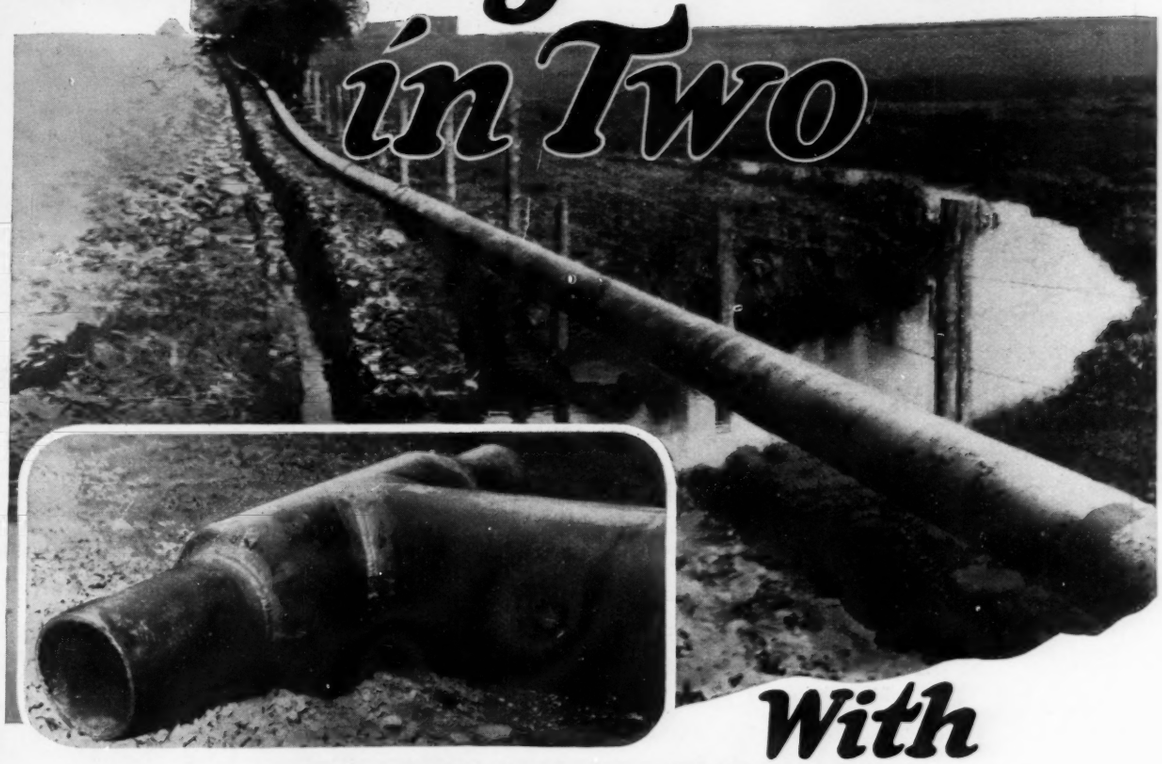
35 E. Wacker Dr., Chicago, Ill.

1754 Graybar Bldg., New York, N. Y.

1314 Magnolia Bldg., Dallas, Texas.

Offices in principal cities

Cutting the Mile in Two



With

DOUBLE LENGTH "NATIONAL" PIPE

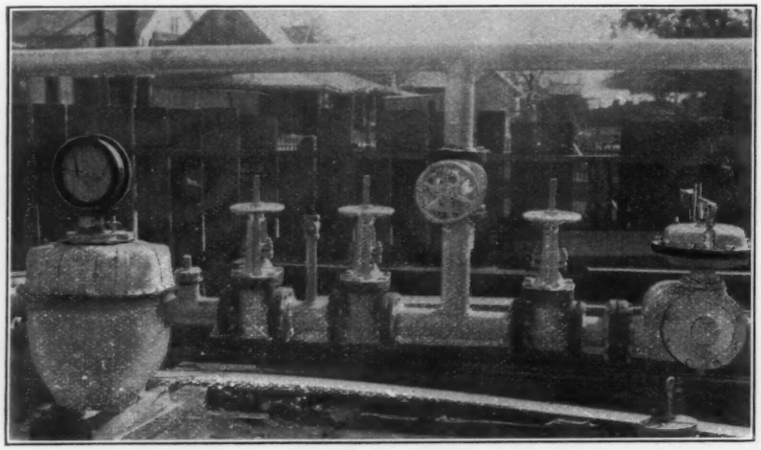
IN the laying of this 18 mile line of 12-inch double random length NATIONAL Pipe there was a considerable saving of time, labor and joint-making materials, due to eliminating approximately one-half the number of joints. Another advantage was that the possibility of leakage was greatly reduced and an all around better line obtained.

NATIONAL is the only pipe made in double random lengths and, in addition to this feature, it is especially desirable for gas lines because of its high tensile strength, uniform structure and good welding qualities—assuring a strong, sound, dependable line from end to end.

Ask for NATIONAL Bulletin No. 26

NATIONAL TUBE COMPANY - Pittsburgh, Pa.

Subsidiary of United States Steel Corporation



Consumer Satisfaction Demands the Best Equipment in Regulators and Meters

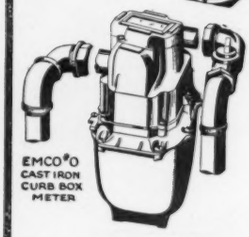
HOTELS consume large quantities of gas in their kitchens, heating plants and in other departments such as laundries. Every cubic foot of gas used must be measured or the gas company loses revenue. The pressure must not vary no matter what conditions may be.

A Texas gas company relies on the EMCO High Pressure Regulator and the EMCO Number Four Large Capacity Gas Meter equipped with an EMCO Combined Record Gauge (for pressure correction) pictured above as its cash register on this service.

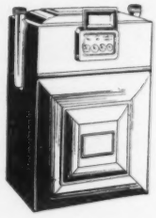
EMCO—*wherever you go*

EMCO #0 CAST IRON DRY GAS METER

IRONCLAD CAST IRON DRY GAS METER

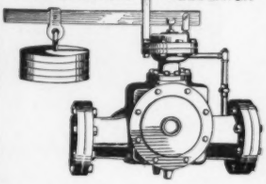


EMCO #0 CAST IRON CURB BOX METER

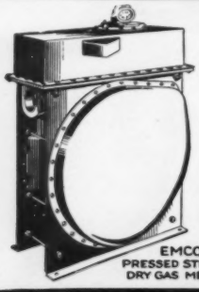


EMCO TIN METER

EMCO HIGH PRESSURE BALANCED VALVE REGULATOR

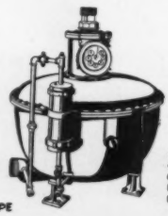


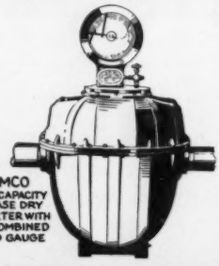
EMCO WATER HEATER AND GAS APPLIANCE REGULATOR



EMCO #5 PRESSED STEEL TYPE DRY GAS METER

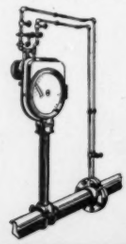
WESTINGHOUSE FLUID POSITIVE GAS METER



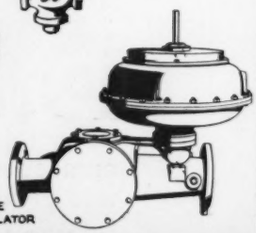


EMCO LARGE CAPACITY CAST CASE DRY GAS METER WITH EMCO COMBINED RECORD GAUGE

EMCO ORIFICE GAS METER



EMCO DOMESTIC SERVICE REGULATOR

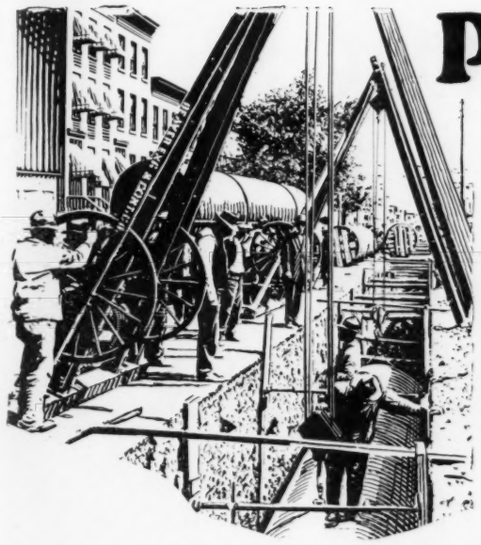


EMCO LOW PRESSURE BALANCED VALVE REGULATOR

PITTSBURGH EQUITABLE METER COMPANY

MAIN OFFICE AND WORKS PITTSBURGH, PA.

NEW YORK CHICAGO COLUMBIA, S.C. LOS ANGELES DALLAS TULSA SEATTLE KANSAS CITY SALT LAKE CITY

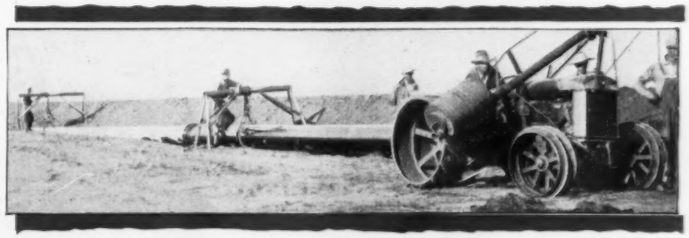


Proof eliminates all guesswork

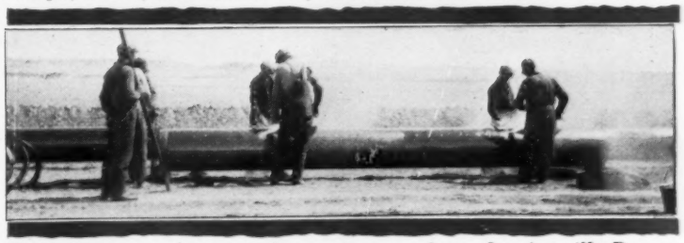
Eight years after the New York Board of Water Supply first used ***Bitumastic Enamel*** for steel water main protection, an inspection so convincingly proved the superiority of this coating that 95% of its steel water mains laid since that time have been specified for ***Bitumastic Enamel*** and coated with it.

The selection of ***Bitumastic Enamel*** for coating oil and gas lines is completely justified by proofs of long service on ships' hulls, water mains and penstocks, where for over forty years it has provided perfect protection under the most adverse conditions.

Write for our booklet "The Protection of Pipe Lines."
It is full of interesting information for the engineer.

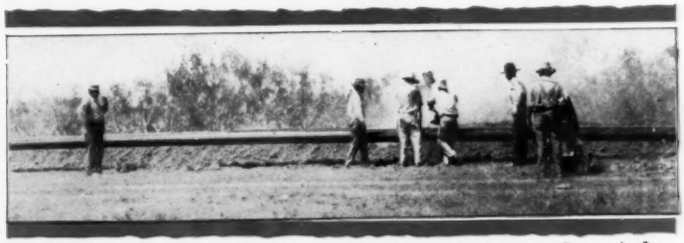


Four hundred miles of the Empire Line (95 per cent) between Pampa, Texas, and Kansas City are coated with Bitumastic Enamel.



Eighty-seven per cent of the coatings used on the Amarillo-Denver line were Bitumastic products. This picture shows the Rolling Rig method.

On the Memphis Line that part (160 miles) which was laid in the flood regions paralleling the Mississippi was protected with Bitumastic Enamel.



The Atlantic Oil Line, which stretches from Midland to Port Arthur, Texas, is protected the whole 500 miles with Bitumastic Enamel.

PROOF

PROVEN PROTECTION FOR PIPE LINES

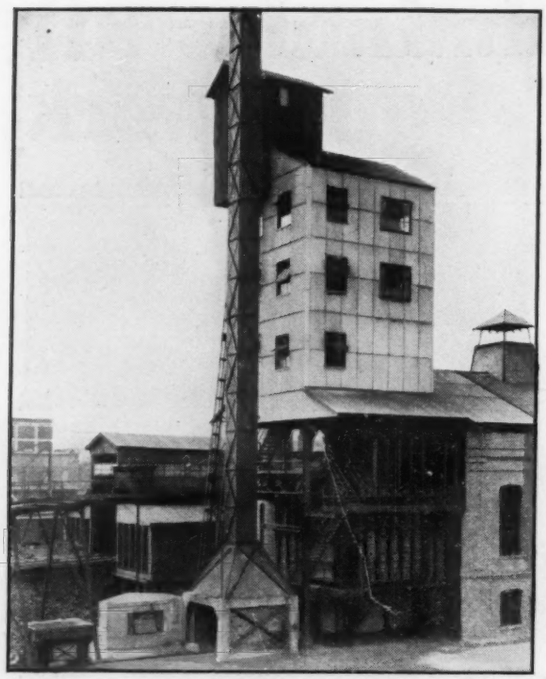
BITUMASTIC

REG. U.S. PAT. OFF

ENAMEL

Wailes Dove-Hermiston Corporation
17 Battery Place, New York

2464 Enterprise St., Los Angeles, Calif. 345 Vermont St., San Francisco, Calif.
Philadelphia Cleveland Chicago Houston Tulsa San Francisco



U. G. I. VERTICAL CHAMBER OVENS

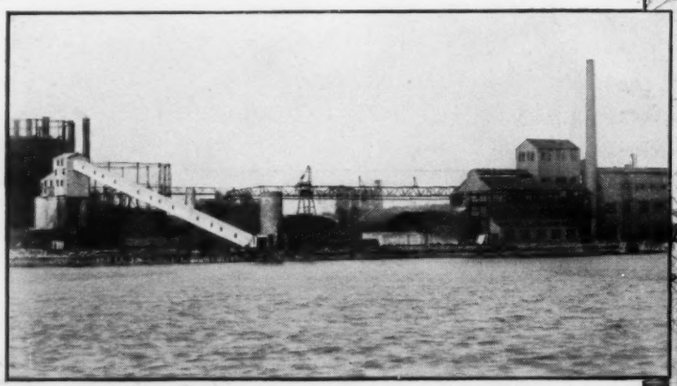
IN SUCCESSFUL OPERATION

Yielding Excellent Gas, Coke, Heating values. . .

In addition to the three Vertical Chamber Ovens illustrated, another, now under construction at Bangor, Maine, will have 300,000 c.f. daily capacity.

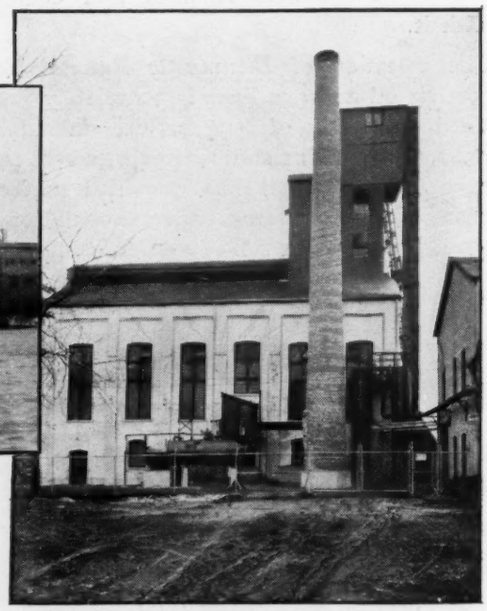
AT DUBUQUE, IOWA

Average Corr. gas made per day	698 M. c. f.
Average Yield per lb. dry coal	6.44 c. f.
Average Calorific value	560 B. t. u.



AT RACINE, WISCONSIN

Average Corr. gas made per day	3,030 M. c. f.
Average Yield per lb. dry coal	7.64 c. f.
Average Calorific value	524 B. t. u.



Average Corr. gas made per day	594 M. c. f.
Average Yield per lb. dry coal	6.85 c. f.
Average Calorific value	543 B. t. u.

AT CLINTON, IOWA

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STATEMENT OF NET PAID CIRCULATION OF

WESTERN GAS

For Six Months Ending June, 1929

PACIFIC STATES

California	969
Oregon	72
Washington	41
	1082

MOUNTAIN STATES

Nevada	6
Utah	7
Arizona	18
New Mexico	17
Colorado	69
Wyoming	16
Idaho	8
Montana	34
	175

WEST SOUTH CENTRAL STATES

Arkansas	30
Louisiana	45
Oklahoma	204
Texas	332
	611

WEST NORTH CENTRAL STATES

Kansas	106
Minnesota	36
Missouri	67
Iowa	48
South Dakota	35
Nebraska	27
North Dakota	14
	333

EAST SOUTH CENTRAL STATES

Mississippi	4
Alabama	4
Tennessee	4
Kentucky, Georgia, and W. Virginia	3
	15

CENTRAL STATES

Wisconsin	10
Michigan	5
Illinois	38
Indiana	16
Ohio	36
	105

ATLANTIC STATES

Maryland	5
Pennsylvania	37
New Jersey	9
New York	58
	109

NEW ENGLAND STATES

Connecticut	11
Massachusetts	4
District of Columbia	2
Vermont	1
	18

MISCELLANEOUS AND FOREIGN

Pacific Islands	12
Panama	4
Canada	14
Central and South America	3
Europe	5
Cuba	1
	39

Total Average Distribution per Issue.....**2758**
Total Average Net Paid per Issue.....2487

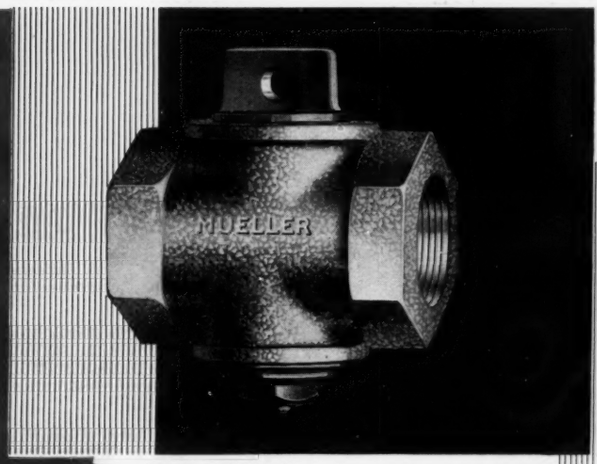
This is to certify that to the best of my knowledge the above is a true and correct statement of the average circulation of WESTERN GAS for the six months ending June 1929.

Jay Stevens
Publisher.

Subscribed and sworn before me this 17th day of June 1929.

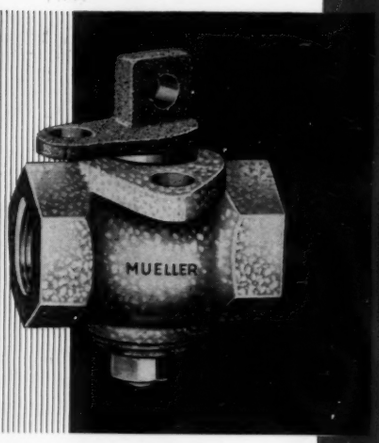
(Seal)

Josephine C. Whiting
Notary Public. (My commission expires March 25, 1932.)



At left: **Mueller G-11100 Flat Head, Iron Body Brass Plug Service Stop.**

Below: **Mueller G-11080 Iron Body Brass Plug Meter Stop.**



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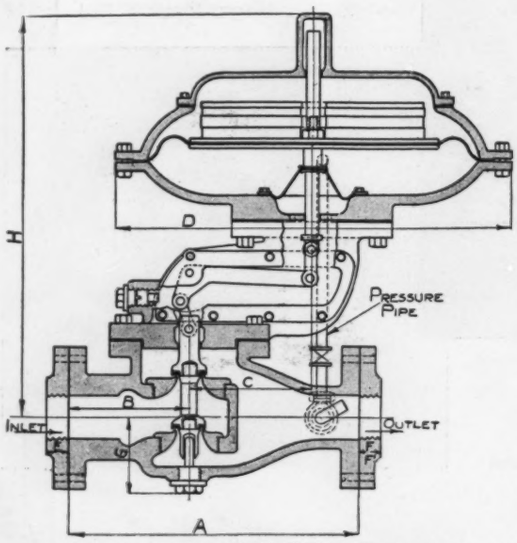
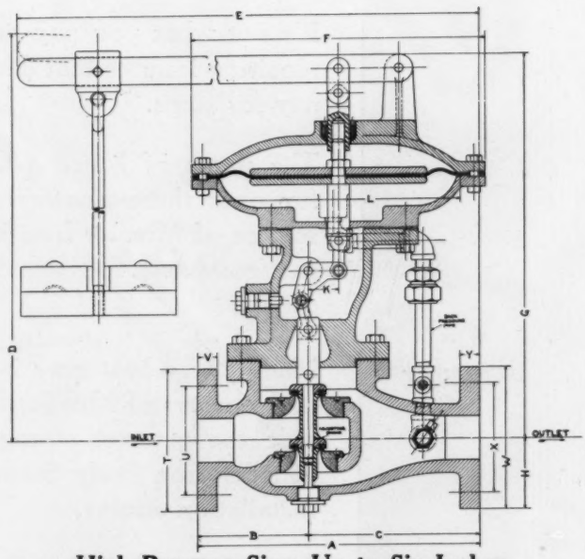


Low Pressure Sizes Up to Six Inches

Reliance
Balanced Valve Regulator

This Regulator embodies many new and novel features which have enabled us to produce a regulator with larger capacity, greater accessibility and a more sensitive and accurate regulation. We offer it in full confidence that it will further enhance the reputation of the Reliance Line.



High Pressure Sizes Up to Six Inches

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Northwest Gas & Electric Equipment Co.
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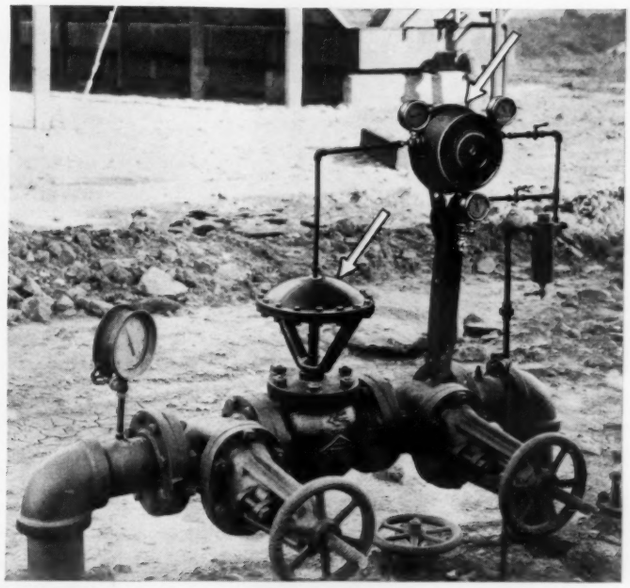
TYCOS

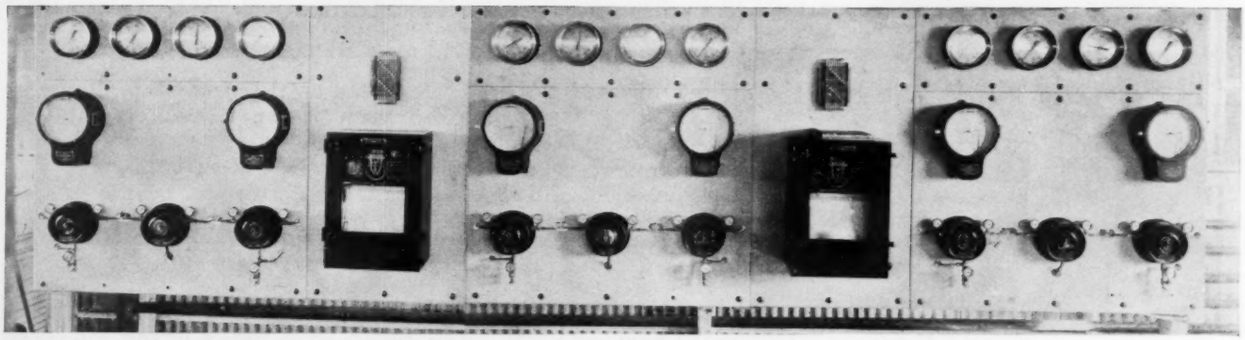
BACK PRESSURE REGULATOR

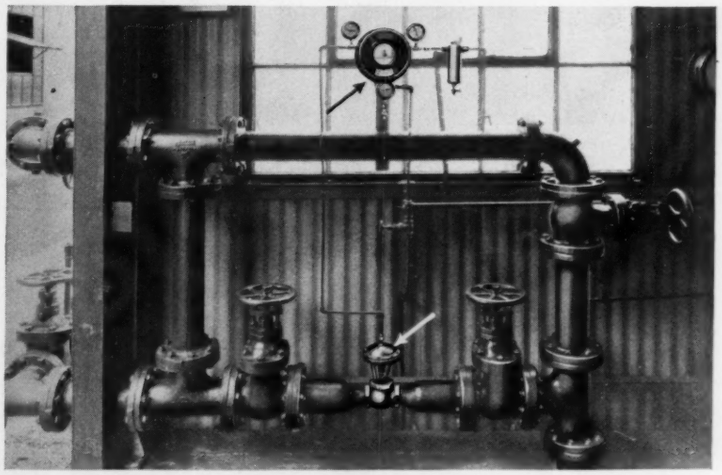
(PILOT OPERATED)

A flexible system of control with a wide application

Note the many usages illustrated—upper photo: the regulator on residue gas line in natural gasoline plant. Center; nine regulators applied to gasoline stabilizers and fractionating towers. Lower photo: regulator controlling gas supply to battery of boilers.







THE TYCOS Back Pressure Regulator is a pilot operated controller, operating either by compressed air or gas. The auxiliary pressure supply works directly against an air valve in instrument proper. This in return operates the pilot valve to release or transmit necessary motive pressure for opening and closing control valve.

The TYCOS Regulator affords immediate, sensitive and positive response to the slightest fraction of pressure change. It can be readily changed from a back pressure controller to a reducing pressure regulator. Also changed from a higher pressure to a lower pressure controller, or vice versa. Complete details on request.

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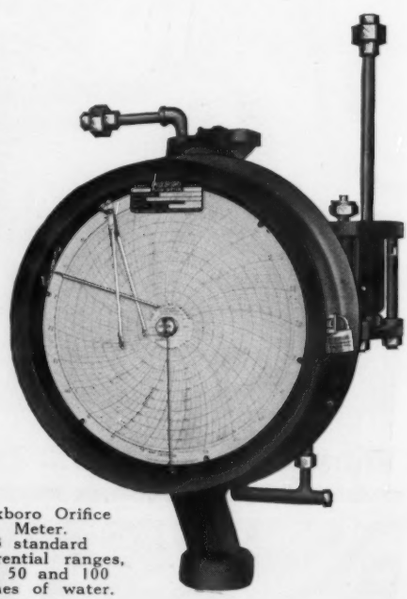

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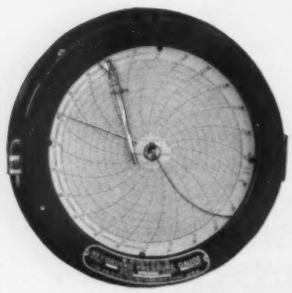
A Continuous, Indisputable Record of Pressure of Gas Leaving the Well

WHETHER the pressure is building up, tapering off, or just a varying flow, is clearly revealed, on the chart records made by Bristol's Recording Gauges. Each pressure change is shown, together with the exact time and extent of happening.

When analyzed over a period of several days such records serve to indicate true rock pressure conditions. This continuous check is especially desirable, due to the fact that the well pressure may read high at the time of initial testing and then later taper off into a low volume producer.

Simply and ruggedly constructed, Bristol's Gauges will operate for years with very little care or adjustment.

Rectangular Form Bristol's Recording Pressure Gauge Model 40. Furnished to record in desired ranges up to 12,000 lbs., per sq. in. Case is made of aluminum alloy, and is of dust-, fume- and moisture-proof construction.



Round Form Bristol's Recording Pressure Gauge, Model 41. Inverted Pen-Arm arrangement is standard. Case is of dust and moisture-proof construction. Finish is black enamel.

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To aid in adapting Bristol's Gauges to your particular needs. Bristol's Engineering service is at your disposal without obligation. For complete information, write our nearest branch office.

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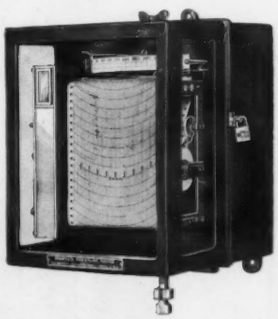
Bristol's Original Form (Moisture-Proof) Recording Pressure Gauge, Model 11-M. This instrument is especially well suited for installation at exposed places in the plant, or out of doors on pipe lines, etc.



Bristol's Strip Chart Type Recording Pressure Gauge. Chart roll used is 90-feet long, and can be set to provide an unbroken record over period of 45, 30 or 15 days.

WESTERN GAS

"Reg. U. S. Pat. Off."

A Monthly Journal of the Gas, Gas Appliance and Natural Gasoline Industries in *Western America*

SAN FRANCISCO LOS ANGELES DALLAS

Our Changing Public Relations

By GEO. L. MYERS

Assistant to the President
Portland Gas and Coke Company
*Portland, Oregon**

FOR a decade or more there has been considerable evolution in the viewpoint of those within the industry and the opinion of those without it upon the subject of "Our Public Relations."

The evolution that has taken place in the opinion held by the public of public utilities can be attributed principally to the conduct of management and personnel, and the creation of a material interest on the part of the customer.

The principal concern of the user of the service of a public utility is its availability and cost. The sort of management which can make the service available with the greatest courtesy and efficiency and at a declining cost will win the greatest public confidence and good will. This is axiomatic and is alike applicable to all economic endeavor. Consequently, the esteem in which a public utility is held by those who use its service is dependent upon the nature of its management. Practices and policies of management will find reflection in the acts of employees. What the management expects of those who act under its direction it must expect of itself. If it is candid, tolerant, courteous and efficient it will beget candor, tolerance, courtesy and efficiency from its rank and file.

The problem of public relations is first a problem of internal relations. Our public relations, like charity, must begin at home. The employees who constitute the family of a public utility must be contented and hopeful. A public utility must have the good will of its employees. Necessarily the major consideration in building up a constructive status in public relations is to first look to the opportunity, welfare and economic security of employees.

Geo. L. Myers

There must be a sympathetic interest on the part of their immediate superiors. They must be concerned about the development of the usefulness of the employee. They must encourage his cooperation by giving a willing ear to suggestions he may have pertaining to the relation of his particular work with the department, bureau or division with which he is affiliated. His superior should help him to develop initiative and responsibility. He must be made to feel that his service is an essential part of the service of all. When he invites counsel in his personal affairs it should be willingly given. A manifestation of personal interest in him will cause him to work with greater enthusiasm, encourage him to greater efforts, and so inspire him with affection for his company that he will be a carrier of good will whether he continues to be employed or finds employment elsewhere.

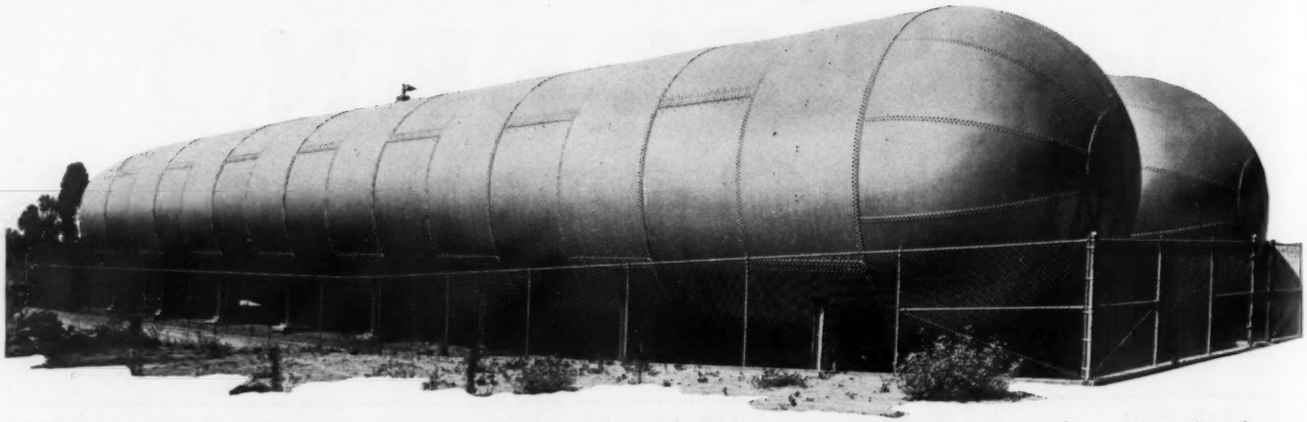
The fullest measure of loyalty, enthusiasm and efficiency among employees is dependent upon more than adequate compensation. There must be an incentive, a joy and a pride in the work one does. There must be more than mere personal pecuniary gain. There must be ahead the possibility of promotion and the opportunity for greater knowledge about the business. Educational courses not only help to equip one for positions of greater responsibility, but by enlarging one's sphere of knowledge they relieve whatever monotony there may be in the routine of one's assigned task. They instill a hope for broader fields of endeavor. Promotions must be made from within the ranks. They must be made as the reward for merit, and not be made because of influence.

There are ways and means of providing for the welfare of employees without being paternalistic. Group insurance with mutual participation in part of its cost, accident prevention and compensation, safe, healthful and pleasant working conditions, associations for individual improvement through various forms of self-expression, the development of special aptitudes outside of one's vocation, social contacts, and recreational opportunities for relaxation, physical development and competitive sports. There should be definite provision for the retirement of superannuated employees with counsel and opportunities for the encouragement and exercise of thrift during the years of service so that the years of incapacity for service may be comfortably lived.

A contented personnel is the first fundamental to functional activities. Functional activities involve a constant observation and analysis of the functional participation of each employee. The individuals who make possible the

(Continued on Page 46)

*Presented before the Northwest Reginonal Conference of the Pacific Coast Gas Association, held at Victoria, B. C., June 7-8. Mr. Myers is vice-chairman of the P. C. G. A. Public Relations Section.



Horizontal cylindrical high pressure holders of 250,000 cu. ft. combined capacity, at 46-5 lbs. pressure, serving southern Counties Gas Company at Sierra Madre, Calif. Vertical-type units are illustrated on front cover of this issue.

A Comparative Cost Study *of* Gas Storage Installation

By ARTHUR F. BRIDGE
Vice-President
Southern Counties Gas Company
Los Angeles, California

IT RECENTLY became necessary to formulate a plan for additional gas storage in our Santa Monica District, comprising some 29,000 meters and with a present peak day sendout of about 8,300 M.c.f. Existing storage facilities consist of a 2,400 M.c.f. low pressure holder station with steam and gas engine driven compressors, 5-pound discharge pressure, totaling 480 M.c.f. hourly capacity.

While this station is ample to equate the present peak day load fluctuations, it was deemed necessary to provide standby storage equivalent to not less than 4 hours delivery from primary sources. This would require total storage equal to about 37 per cent of peak day sendout, and this relation was used in planning the program of future storage installations.

An economic study was made to determine the type and size of storage unit which would afford the lowest costs for a program totalling 4,000 M.c.f., and extending over a period of 15 years. The results of this study are tabulated below, and from them it is interesting to note the savings which may be effectd by the installation of the pressure type holders in relatively small increments.

We are operating 12 holder stations of various sizes and types, and our experience with the pressure type dates from 1921, when a 100 M.c.f. holder was erected at Azusa. We now have 5,900 M.c.f. in pressure holders, ranging in unit capacity from 100 M.c.f. to 500 M.c.f., and in maximum working pressure from 32 pounds to 75 pounds.

It is estimated that the annual rate of increase in peak load of the Santa Monica District will lie within the range of 5 per cent to 10 per cent, and calculations have therefore been made for both rates of growth. The discussion and tables which follow deal with the costs of several alternative programs of storage installation conforming to the assumed rates of increase in load.

The unit cost of pressure holders varies much less than the low pressure type, with change in capacity, because the weight of steel of the former per M.c.f. of net capacity is practically unaffected by change in dimensions, provided the pressure range is constant. This relation makes it economical to install pressure storage in much smaller increments than is possible with the low pressure type, without undue increase in the total cost of a given storage program. We are thus enabled to save the fixed charges on unused storage capacity, which is unavoidable when relatively large units are installed.

The basis which has been used in comparing the several projects is the aggregate sum which, established at the beginning of the period, with compound interest at 6 per cent on unappropriated balances, will provide for the following:

1. The cost of each element of capital as rquired.

2. The annual costs, except interest, namely Depreciation, Maintenance, Operating Expenses, attributable to each element of capital, capitalized at 6 per cent.

The sum so determined for each program represents the present worth of all future expenditures, and the interest on

HIGH relative costs of low pressure gas storage installations when made in small units have given rise to the development of high pressure storage in recent years, much of the pioneering of high pressure storage, as regards design of holders and their application to effect maximum flexibility on the distribution system, has been done by the Southern Counties Gas Company through the work of Arthur F. Bridge and M. R. Thompson, vice-presidents of that utility. Types of high pressure holders originated have included the hydraulic displacement units, and the vertical and horizontal compression tanks with hemispherical ends, illustrated in this issue of *Western Gas.*

Arthur F. Bridge

Mr. Bridge in his present discussion gives the results of a late engineering study into comparative costs of low and high pressure storage for addition to his company's system in increments over a period of years.
—*Editor.*

this sum is the equivalent mean annual cost. It has been assumed that operators would be required for control of distribution pressure at the holder station, regardless of the type of storage installed; that labor charges would therefore be common to all projects and these are accordingly excluded from the calculations.

Four programs have been computed for each assumed rate of increase in peak load (5 per cent and 10 per cent) as follows:

FOUR PROGRAMS COMPUTED

Pressure Type: Programs 1 and 1-A. First installation, two 500 M.c.f. units and single 500 M.c.f. units thereafter.

Programs 2 and 2-A. First installation, two 750 M.c.f. units and single 750 M.c.f. units thereafter.

Low pressure Type: Programs 3 and 3-A. First installation, one 2000 M.c.f. unit. Second installation, one 2000 M.c.f. unit.

Programs 4 and 4-A. One 4000 M.c.f. unit.

The low pressure holder stations include three gas engine-driven compressors of 170 H.P. each. Each unit has an hourly delivery capacity of 290 M. against a 5-pound discharge pressure.

TABLE NO. 1. SHOWING ESTIMATED PEAK LOADS, STORAGE REQUIREMENTS, AND PROGRAMS OF HOLDER INSTALLATION. BASED ON STORAGE EQUIVALENT TO 37 PER CENT OF PEAK DAY SENDOUT

Year Winter	Peak Day Sendout M. C. F.	Required Total Storage M. C. F.	Required Additional Storage As Compared With Present Capacity	Required Additional Storage Increment	Proposed Installation Programs — HIGH PRESSURE — Installation Program No. 1 — 500 M. C. F. Units Total Installed	Installation Program No. 1 — 500 M. C. F. Units Increment	Installation Program No. 2 — 750 M. C. F. Units Total Installed	Installation Program No. 2 — 750 M. C. F. Units Increment	LOW PRESSURE — Installation Program No. 3 — 2,000 M. C. F. Units Total Installed	Installation Program No. 3 — 2,000 M. C. F. Units Increment	Installation Program No. 4 — 4,000 M. C. F. Units Total Installed	Installation Program No. 4 — 4,000 M. C. F. Units Increment	Compressors Increment Capacity H. P.
ASSUMING 5% ANNUAL INCREASE													
1928–29	8,300	3,071	671	671	0	.....	0	.....	0	.....	0	.....	.....
1929–30	8,715	3,225	825	154	1,000	1,000	1,500	1,500	2,000	2,000	4,000	4,000	170
1930–31	9,151	3,386	986	161	1,000	.....	1,500	.....	2,000	.....	4,000	.....	.....
1931–32	9,608	3,555	1,155	169	1,500	500	1,500	.....	2,000	.....	4,000	.....	.....
1932–33	10,089	3,733	1,333	178	1,500	.....	1,500	.....	2,000	.....	4,000	.....	.....
1933–34	10,593	3,919	1,519	186	2,000	500	2,250	750	2,000	.....	4,000	.....	170
1934–35	11,123	4,116	1,716	197	2,000	.....	2,250	.....	2,000	.....	4,000	.....	.....
1935–36	11,679	4,321	1,921	205	2,000	.....	2,250	.....	2,000	.....	4,000	.....	.....
1936–37	12,262	4,537	2,137	216	2,500	500	2,250	.....	4,000	2,000	4,000	.....	.....
1937–38	12,876	4,764	2,364	227	2,500	.....	3,000	750	4,000	.....	4,000	.....	.....
1938–39	13,520	5,002	2,602	238	3,000	500	3,000	.....	4,000	.....	4,000	.....	.....
1939–40	14,195	5,252	2,852	250	3,000	.....	3,000	.....	4,000	.....	4,000	.....	170
1940–41	14,905	5,515	3,115	263	3,500	500	3,750	750	4,000	.....	4,000	.....	.....
1941–42	15,650	5,791	3,391	276	3,500	.....	3,750	.....	4,000	.....	4,000	.....	.....
1942–43	16,433	6,080	3,680	289	4,000	500	3,750	.....	4,000	.....	4,000	.....	.....
1943–44	17,255	6,384	3,984	304	4,000	.....	4,000	250	4,000	.....	4,000	.....	.....
ASSUMING 10% ANNUAL INCREASE													
1928–29	8,300	3,071	671	671	0	.....	0	.....	0	.....	0	.....	.....
1929–30	9,130	3,378	978	307	1,000	1,000	1,500	1,500	2,000	2,000	4,000	4,000	170
1930–31	10,043	3,716	1,316	338	1,500	500	1,500	.....	2,000	.....	4,000	.....	.....
1931–32	11,047	4,087	1,687	371	2,000	500	2,250	750	2,000	.....	4,000	.....	170
1932–33	12,152	4,496	2,096	409	2,000	.....	2,250	.....	2,000	.....	4,000	.....	.....
1933–34	13,367	4,946	2,546	450	2,500	500	3,000	750	4,000	2,000	4,000	.....	.....
1934–35	14,704	5,440	3,040	494	3,000	500	3,000	.....	4,000	.....	4,000	.....	170
1935–36	16,175	5,985	3,585	545	3,500	500	3,750	750	4,000	.....	4,000	.....	.....
1936–37	17,793	6,583	4,183	598	4,000	500	4,000	250	4,000	.....	4,000	.....	.....

TABLE NO. 2. DETAILED COMPARATIVE COSTS OF HOLDER STATIONS OF VARIOUS TYPES TOTAL CAPACITY 4,000 M. C. F.

ITEM	PRESSURE TYPE — Increments of 1,500 M. C. F. (Approx.) — Unit Cost	Total Cost	1st Increment 1,000 M. Later Increments 500 M. — Unit Cost	Total Cost	LOW PRESSURE WATER TYPE — 2—2,000 M. C. F. Units — Unit Cost	Total Cost	1—4,000 M. C. F. Units — Unit Cost	Total Cost
Holders	93.00	372,000	96.40	385,600	80.00	320,000	74.00	296,000
Inspection, Water and Miscelleanous	1.40	5,600	1.50	6,000	1.70	6,800	1.40	5,600
Painting	5.00	20,000	5.00	20,000	4.70	18,800	3.60	14,400
Sub Total	99.40	397,600	102.90	411,600	86.40	345,600	79.00	316,000
Foundation	1.20	4,800	1.20	4,800	10.00	40,000	8.00	32,000
Sub-Totals	100.60	402,400	104.10	416,400	96.40	385,600	87.00	348,000
Land	4.70	18,800	4.70	18,800	5.30	21,200	3.60	14,400
Piping,* Regulators	1.40	5,600	1.50	6,000	1.00	4,000	.75	3,000
Sub-Totals	106.70	426,800	110.30	441,200	102.70	410,800	91.35	365,400
Compressor Station	.....	.....	.....	.....	14.63	58,500	14.63	58,500
TOTALS	106.70	426,800	110.30	441,200	117.33	469,300	105.98	423,300

*Exclusive of compressor station piping.

TABLE NO. 3. DETAILED SCHEDULE OF CAPITAL EXPENDITURES FOR STORAGE AND ANNUAL COSTS ASSUMING 5 PER CENT YEARLY INCREASE IN STORAGE REQUIREMENTS

Increment Storage Capacity M. C. F.	Description of Items Installed	Year Installed	Holder and Foundation Cost	Land Cost	Cost of Regulators and Piping	Compressors and Buildings	Total Cost	ANNUAL COST: Depreciation	Maintenance	Fuels, Lubricants, Supplies	Total Annual Cost
	PROGRAM NO. 1—PRESSURE TYPE										
1,000	Holders and Foundations Complete With Regulators and Piping	1929	$102,300	$4,700	$6,000	.....	$113,000	$ 700	$ 600	.....	$1,300
500	Holder and Foundation	1931	52,350	2,350	.....	.....	54,700	338	300	.....	638
500	Holder and Foundation	1933	52,350	2,350	.....	.....	54,700	338	300	.....	638
500	Holder and Foundation	1936	52,350	2,350	.....	.....	54,700	338	300	.....	638
500	Holder and Foundation	1938	52,350	2,350	.....	.....	54,700	338	300	.....	638
500	Holder and Foundation	1940	52,350	2,350	.....	.....	54,700	338	300	.....	638
500	Holder and Foundation	1942	52,350	2,350	.....	.....	54,700	338	300	.....	638
4,000	TOTAL		$416,400	$18,800	$6,000	.....	$441,200	$2,728	$2,400	.....	$5,128
	PROGRAM NO. 2—PRESSURE TYPE										
1,500	Holders and Foundation Complete With Regulators and Piping	1929	$150,900	$7,050	$5,600	.....	$163,550	$1,011	$ 900	.....	$1,911
750	Holder and Foundation	1933	76,950	3,525	.....	.....	80,475	497	450	.....	947
750	Holder and Foundation	1937	76,950	3,525	.....	.....	80,475	497	450	.....	947
750	Holder and Foundation	1940	76,950	3,525	.....	.....	80,475	497	450	.....	947
250	Holder and Foundation	1943	25,650	1,175	.....	.....	26,825	166	150	.....	316
4,000	TOTAL		$407,400	$18,800	$5,600	.....	$431,800	$2,668	$2,400	.....	$5,068
	PROGRAM NO. 3—LOW PRESSURE WATER TYPE										
2,000	Holder and Foundation Complete, Station Building and Gas Piping, One Compressor Unit With Fuel, Water, Gas and Exhaust Piping and Auxiliaries	1929	$192,800	$12,000	$4,000	$31,900	$240,700*	$1,271 (Holder)	$1,000	.....	.....
								1,370 (Comp. Equip.)	160	827	$4,628
	One Compressor and Piping	1933	.....	.....	.....	13,300	13,300	571	160	827	1,558
2,000	Holder and Foundation	1936	192,800	9,200	.....	.....	202,000	1,245	1,000	.....	2,245
	One Compressor and Piping	1939	.....	.....	.....	13,300	13,300	571	160	827	1,558
4,000	TOTAL		$385,600	$21,200	$4,000	$58,500	$469,300	$5,028	$2,480	$2,481	$9,989
	PROGRAM NO. 4—LOW PRESSURE WATER TYPE										
4,000	Holder and Foundation Complete, Station Building and Gas Piping, One Compressor Unit With Fuel, Water, Gas and Exhaust Piping and Auxiliaries	1929	$348,000	$14,400	$3,000	$31,900	$397,300	$2,267 (Holder)	$2,000	$ 827	$6,624
								1,370 (Comp. Equip.)	160	.....	.....
	One Compressor and Piping	1933	.....	.....	.....	13,300	13,300	571	160	827	1,558
	One Compressor and Piping	1939	.....	.....	.....	23,300	13,300	571	160	827	1,558
4,000	TOTAL		$348,000	$14,400	$3,000	$58,500	$423,900	$4,779	$2,480	$2,481	$9,740

*Includes building for 3 units—$8,100.00.

TABLE NO. 4. CALCULATIONS OF COMPARATIVE TOTAL EQUIVALENT INVESTMENT AND ANNUAL COSTS ASSUMING 5 PER CENT YEARLY INCREASE IN STORAGE REQUIREMENTS

1	2	3	4	5	6	7	8
Year Installed	Period Elapsed Since 1929 Years	Capital Expenditure Required	Annual Costs Exclusive of Labor and Interest)	Column 4 Captialized at 6%	Total Equivalent Capital Required at Date of Installation (3 + 5)	Initial Sum Compounded Annually Which Will Provide Col. 6 at Date of Installation or Present Worth of Col. 6	Interest at 7% on Col. 7 (Equivalent Total Mean Annual Cost of Project)
			PROGRAM NO. 1—PRESSURE TYPE—500 M. C. F. UNITS				
1929	...	$113,000	$1,300	$ 21,667	$134,667	$135,667	.....
1931	2	54,700	638	10,633	65,333	57,997	.....
1933	4	54,700	638	10,633	65,333	51,484	.....
1936	7	54,700	638	10,633	65,333	43,061	.....
1940	11	54,700	638	10,633	65,333	33,933	.....
1942	13	54,700	638	10,633	65,333	30,123	.....
TOTALS		$441,200	$5,128	$ 85,465	$526,665	$389,491	$27,264
			PROGRAM NO. 2—PRESSURE TYPE—750 M. C. F. UNITS				
1929	...	$163,550	$1,911	$ 31,850	$195,400	$195,400	.....
1933	4	80,475	947	15,783	96,258	75,854	.....
1937	8	80,475	947	15,783	96,258	59,775	.....
1940	11	80,475	947	15,783	96,258	49,995	.....
1943	14	26,825	316	5,267	32,092	13,941	.....
TOTALS		$431,800	$5,068	$ 84,466	$516,266	$394,965	$27,648
			PROGRAM NO. 3—LOW PRESSURE TYPE—2,000 M. C. F. UNITS				
1929	...	$240,700	$4,628	$ 77,133	$317,833	$317,833	.....
1933	4	13,300	1,558	25,967	39,267	30,944	.....
1936	7	202,000	2,245	37,417	239,417	157,800	.....
1939	10	13,300	1,558	25,967	39,267	21,646	.....
TOTALS		$469,300	$9,989	$166,484	$635,784	$528,233	$36,976
			PROGRAM NO. 4—LOW PRESSURE TYPE—4,000 M. C. F. UNITS				
1929	...	$397,300	$6,624	$110,400	$507,700	$507,700	.....
1933	4	13,300	1,558	25,967	39,267	30,944	.....
1939	10	13,300	1,558	25,967	39,267	21,646	.....
TOTALS		$423,900	$9,740	$162,334	$586,234	$560,290	$39,220

TABLE NO. 5. DETAILED SCHEDULE OF CAPITAL EXPENDITURES FOR STORAGE AND ANNUAL COSTS ASSUMING 10 PER CENT YEARLY INCREASE IN STORAGE REQUIREMENTS

Increment Storage Capacity M. C. F.	Description of Items Installed	Year Installed	Holder and Foundation Cost	Land Cost	Cost of Regulators and Piping	Compressors and Buildings	Total Cost	ANNUAL COST: Depreciation	Maintenance	Fuels, Lubricants, Supplies	Total Annual Cost
	PROGRAM NO. 1-A—PRESSURE TYPE										
1,000	Holders and Foundation Complete With Regulators and Piping	1929	$102,300	$4,700	$6,000	.....	$113,000	$ 700	$ 600	.....	$1,300
500	Holder and Foundation	1930	52,350	2,350	.....	.....	54,700	338	300	.....	638
500	Holder and Foundation	1931	52,350	2,350	.....	.....	54,700	338	300	.....	638
500	Holder and Foundation	1933	52,350	2,350	.....	.....	54,700	338	300	.....	638
500	Holder and Foundation	1934	52,350	2,350	.....	.....	54,700	338	300	.....	638
500	Holder and Foundation	1935	52,350	2,350	.....	.....	54,700	338	300	.....	638
500	Holder and Foundation	1936	52,350	2,350	.....	.....	54,700	338	300	.....	638
4,000	TOTAL		$416,400	$18,800	$6,000	.....	$141,200	$2,728	$2,400	.....	$5,128
	PROGRAM NO. 2-A—PRESSURE TYPE										
1,500	Holder and Foundations Complete With Regulators and Piping	1929	$150,900	$7,050	$5,600	.....	$163,550	$1,011	$ 900	.....	$1,911
750	Holder and Foundation	1931	76,950	3,525	.....	.....	80,475	497	450	.....	947
750	Holder and Foundation	1933	76,950	3,525	.....	.....	80,475	497	450	.....	947
750	Holder and Foundation	1935	76,950	3,525	.....	.....	80,475	497	450	.....	947
250	Holder and Foundation	1936	25,650	1,175	.....	.....	26,825	166	150	.....	316
4,000	TOTAL		$407,400	$18,800	$5,600	.....	$431,800	$2,668	$2,400	.....	$5,068
	PROGRAM NO. 3-A—LOW PRESSURE WATER TYPE										
2,000	Holder and Foundation Complete, Station Building and Gas Piping, One Compressor Unit With Fuel, Water, Gas and Exhaust Piping and Auxiliaries	1929	$192,800	$12,000	$4,000	$31,900	$240,700*	$1,271 (Holder) (Comp. Equip.)	$1,000 160	$ 827	$4,628
	One Compressor and Piping	1931	.....	.....	.....	13,300	13,300	571	160	827	1,558
2,000	Holder and Foundation	1933	192,800	9,200	.....	.....	202,000	1,245	1,000	.....	2,245
	One Compressor and Piping	1934	.....	.....	.....	13,300	13,300	571	160	827	1,558
4,000	TOTAL		$385,600	$21,200	$4,000	$58,500	$469,300	$5,028	$2,480	$2,481	$9,989
	PROGRAM NO. 4-A—LOW PRESSURE WATER TYPE										
4,000	Holder and Foundation Complete, Station Building and Gas Piping, One Compressor Unit With Fuel, Water, Gas and Exhaust Piping and Auxiliaries	1929	348,000	14,400	3,000	31,900	397,300	2,267 (Holder) 1,370 (Comp. Equip.)	2,000 160	 827	 6,624
	One Compressor and Piping	1931	.....	.....	.....	13,300	13,300	571	160	827	1,558
	One Compressor and Piping	1934	.....	.....	.....	13,300	13,300	571	160	827	1,558
4,000	TOTAL		$348,000	$14,400	$3,000	$58,500	$423,900	$4,779	$2,480	$2,481	$9,740

*Includes building for 3 units—$8,100.00.

The initial installation consists of one compressor, building, piping and auxiliaries. Unit costs for the various projects were derived as follows:

Pressure holders: Bids which have been received for holders for the Santa Monica project. Costs of foundations, painting, piping, regulators, etc., from our experience on similar jobs.

Low pressure holders: Based on representative quotations checked against our cost for a 2000 M.c.f. holder erected at Venice. Paniting, foundation, piping, etc., from our Venice holder costs.

Compressor station: Taken from actual costs of one and two-unit plants at Venice and Santa Paula, excluding from the latter, heat exchangers, cooling tower, operator's cottage, etc., which would not be required in the station under consideration.

Annual maintenance and operating costs: Based on our actual experience, operating data from field compressor stations being corrected to 15 per cent annual load factor.

Table No. 1 shows peak day sendouts, required total and additional storage to maintain a 37 per cent ratio for 5 per cent and 10 per cent annual increase, together with the proposed programs of storage installation conforming thereto.

Table No. 2 gives a detailed comparison of the costs of several 4,000 M.c.f. holder stations, consisting of different types and sizes of units. The first project consists of high pressure tanks, of 750 M.c.f. net capacity between a pressure range of 50 pounds and 5 pounds. The figures shown include the value of the land occupied. The second consists of 500 M.c.f. tanks, and the third and fourth, low pressure water type holder stations, consisting of 2000 and 4000 M.c.f. units respectively. It is to be noted that for the pressure type the total first cost for the station consisting of 750 M.c.f. horizontal tanks is $426,800, which compares with $469,300 for the two 2,000 M.c.f. low pressure units, and $423,900 for the single 4,000 M.c.f. unit.

Tables No. 3 and No. 5 comprise the detailed programs of installation of holder and compressor equipment corresponding to the two assumed annual rates of increase in sendout.

Tables No. 4 and No. 6 show the derivation of the present worth of each of the four projects, for annual rates of growth of 5 per cent and 10 per cent respectively. Note that for a 5 per cent rate of growth the 500 M.c.f. pressure type units yield a figure of $389,491, approximately $4,500 less than the 750 M.c.f. pressure units and $139,000 less than the installation consisting of 2,000 M.c.f. low pressure holders. With 10 per cent yearly increase in storage requirements there is very little difference between the equivalent costs of the two pressure type programs and the low pressure programs also approach equality, but there is still a difference in favor of the pressure type of approximately $127,000.

(For Table No. 6, See Page 51)

Appliance Merchandising *on a* 200-Town Gas System

THE Community Natural Gas Company was organized in 1925 as a distributing subsidiary of the Lone Star Gas Corporation, and now distributes natural gas in 200 towns in Texas and Oklahoma, serving approximately 60,000 meters. Nearly 100 towns were added to our system in the past two years.

In many of our towns efforts were being made to secure additional consumers, and in the majority of cases, the greatest obstacle was the prospective consumers' financial inability to pay cash for house-piping and appliances. The situation in the new towns which were being piped also had considerable bearing on the organization of our new business departments, as in most cases these towns were flooded with inferior appliances sold in every conceivable kind of store—from grocery to jewelry. It was finally decided that as a matter of self-protection it was necessary that such a department be created, and our first sales room was opened at Greenville, Texas, January 1, 1928, under the supervision of the district superintendent, with the assistance of a salesman.

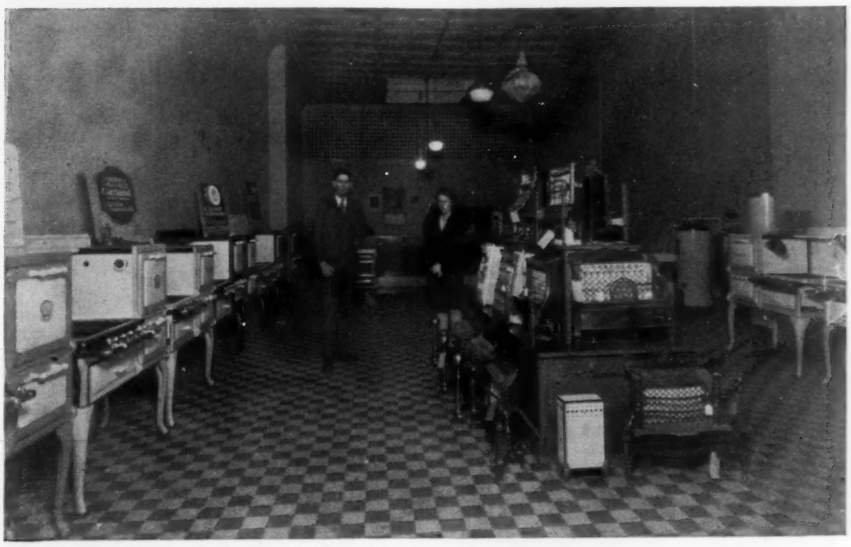
The selection of men as new business representatives was quite a problem; however, it was decided that instead of hiring outside men for the jobs we would endeavor to train men in our own organization. With a few exceptions, this has proved highly satisfactory; and, while several experienced men have been obtained from other companies, for the most part the department was made up of our own men. District managers were appointed covering certain prescribed districts with salesmen under their supervision in each of our towns. The salesmen were employed on a salary and commission basis and the district managers on a salary and commission based on the total sales from their districts. During the past year when we were obtaining new towns very rapidly, it was necessary that our organization endeavor to keep up with the growth of the company. Obtaining experienced men as rapidly as needed presented considerable difficulty. During our embryonic period we were fortunate to realize that it was very necessary that all of our local agents, and in fact, all employees become thoroughly sold on the necessities of a new business department; so, instead of making this a separate department, in all cases, all local new business activities were under the supervision of the local agent with the assistance of the instruction of the new business manager in Dallas. This has proved very satisfactory, nad as our towns have reached a certain period of saturation, we have been able to discontinue the use of a salesman and allow the local agent and his force to carry on new business activities. In towns the size of many of ours it is not financially possible to maintain a salesman at all times as the business does not warrant his employment; however, with the training the local agent has had, he is very capable of carrying on the work started by our new business representatives.

All of our representatives also act as public relation and service men, as in their canvass for prospects for the sale of gas-burning appliances or for new consumers, it is a part of their duty to adjust improperly operating appliances, answer all questions relative to company policy, and take care of all complaints. In this way, the operating department is considerably relieved from service calls and complaints. Regarding our relationship with other appliance dealers in our towns, these have always been very cordial. Our representatives are instructed to be very careful in speaking of any merchandise offered for sale in the town. Our prices are fair and we endeavor at all times

SENSING some of the problems involved in instituting an aggressive merchandising program on a gas system comprising 200 or more communities—most of them small ones—*Western Gas* requested the executives of the Community Natural Gas Company to relate their experiences with appliance selling since beginning that activity more than a year ago. This article is the result of our request.

The "Community's" entrance into merchandising has been gone about with energy. It takes energy to make a sales program keep step when new communities are added to the system at a rate of almost 50 a year! Under the executive supervision of F. L. Chase, president of the company, and Chester L. May, its general superintendent, these aggressive sales efforts, told of herein, are bearing fruit in a constantly growing gas load.—*Editor.*

Bryan, Texas, sales headquarters for the Community Natural Gas Company.



Typical of the complete display of domestic gas burning equipment on Community Natural Gas Company sales floors is this array at the Community's Georgetown, Texas, offices.

to maintain only clean competition. In several cases local dealers have shown considerable anxiety as to when we were going to open our sales room or put on a demonstration. They realize that by our efforts in this line, interest in gas appliances is created in the town and naturally they obtain some results from this stimulated interest. In our territory, as no doubt in all others, there is considerable loyalty to the local merchants, and they realize that they too will cash in on our activities such as advertising, canvassing, demonstrations, etc. In offering our merchandise to the public we make no extravagant claims regarding its superiority over that of other dealers, either by advertising or by our solicitors. We present the facts that naturally the gas company is the logical place to buy gas appliances, owing to our experience in their operation and our selfish interest that the customers have only the best in appliances to reduce our service complaints; we stress the necessity for the consumer purchasing only American Gas Association approved appliances; we offer convenient terms; and the strongest factor of all is our service to the consumer after the appliance is installed.

When summed up, as we see it, the day when the gas company's interest in its product ceases after it has passed the meter is gone forever. The word "service" has been worked to death in gas company advertising, but even yet it is a very important factor and we know of nowhere that service can be better demonstrated than in assisting the consumer to obtain proper appliances for efficient consumption of our product. We are in business solely for one purpose—to sell gas. In order to sell gas, we must show an interest in the equipment that consumes our product. Should we not quite naturally be interested in assisting this prospective consumer to obtain the best possible equipment, so that eventually we may hope to reach that Utopia of all public utility—*Satisfied Consumers?* The problem of public relations is growing greater with all utilities. All companies maintain high-salaried executives and staffs whose duty it is to improve relations between the distributor and consumer. As rate-making problems increase, so naturally does the problem of public relations. We feel that with a force of 25 men scattered over our system whose sole duty it is to assist our consumers in obtaining better appliances, to remedy complaints, make needed adjustments etc. that our new business department becomes the finest of public relation factors.

Sales rooms are now operated in conjunction with our business offices in the following Texas towns: Taylor, Bryan, Georgetown, Cameron, Belton, Temple, Gatesville, Greenville, Sulphur Springs, Commerce, Mexia, Terrell, Teague, Bonham, Eastland, Albany, Baird, Sweetwater, Snyder, Colorado, Ballinger, Winters, and in these Oklahoma communities: Hugo, Durant, Wynnewood, Pauls Valley, Sulphur, Frederick.

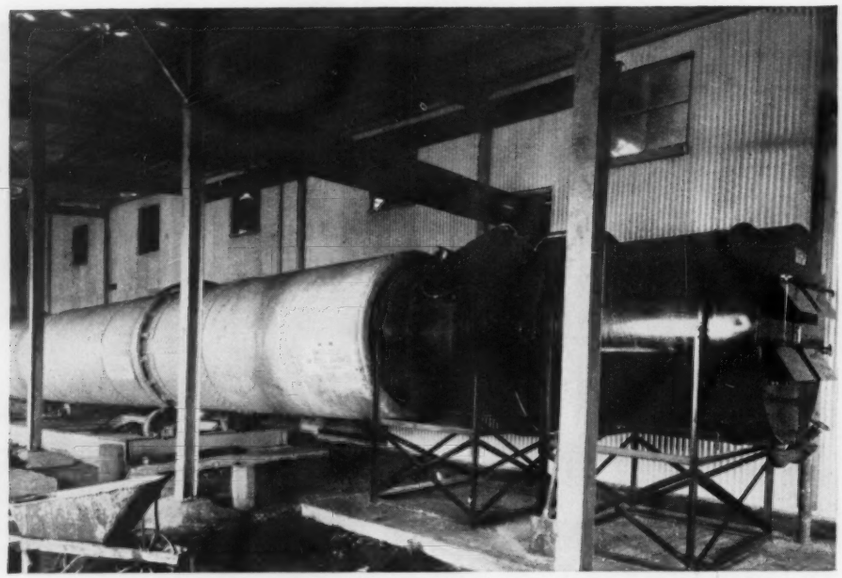
The above towns were opened as rapidly as possible during the past year, and in nearly every case, results have been gratifying. Our stocks consist of ranges, water heaters, circulating heaters, incinerators and refrigerators—and other special appliances. We have been fortunate due to the fact that we have been able to open in a number of new gas towns, and our sales in these have been exceptionally good. Our merchandising policy consists of the piping of houses for gas and the installation of all appliances on a conditional sales contract for a reasonable down-payment—and the balance monthly with the gas bill. In this way we have been able to add a number of new consumers who were unable to pay cash for house-piping and appliances. All installation work is done by our own organization in each of our towns, and all appliances are sold at an installed price. This eliminates any difficulties with the consumer over cost of installation.

With the assistance of manufacturers' agents, campaigns and demonstrations on ranges, water heaters and space heaters have been successfully conducted. A competitive spirit has been injected into these campaigns through the offering of prizes, both by this company and the manufacturers, for the salesman showing best results. It may be well to mention here the success we have had with natural gas demonstrations in our towns long before gas was available to the citizens of the community.

We have gone to considerable expense to offer prospective consumers a real natural gas demonstration when our mains were many miles away. This was done in the following manner which will prove of interest to other companies:

The ends of several joints of 16-inch pipe were closed with an orange peel and welded; then, 1¼-inch nipples were welded in each end, on which was placed a Merco-Nordstrom plug valve. The holders thus prepared were filled by connecting one end to the main line blow-off at a measuring station, purging the air out through the other end. The holders were then filled at main line pressure (in this case, 250 pounds) and then hauled to the town in which they were to be used. These holders were placed in the rear of our offices and hooked up to the appliance line using a "gold bug" and service regulator. We found it good practice to install a spring gauge at the opposite end to ascertain just how rapidly the holder was being depleted. The capacity of our holders was approximately 450 cu. ft., which was sufficient to keep two ranges in practically constant operation for three demonstrations of four hours each. We feel that the results obtained from these

(Continued on Page 50)



Gas burner and furnace combination being installed for dehydrating kelp at San Pedro, Calif., plant of Philip R. Park, Inc. Kelp is an important source of organic iodine

ABOVE:
A power fork full of seaweed (kelp), on its way to the cutter.

Drying Seaweed *by* Gas Heat

By N. H. KING
Commercial Agent
Southern Counties Gas Company
San Pedro, California

ONE of the newest as well as one of the most interesting industries on the lines of the Southern Counties Gas Company at San Pedro, California, is the plant of Philip R. Park, Inc., which uses gas in the drying of "kelp" or seaweed.

The only available source of organic iodine as a food was fish or fish meal, until the introduction by this firm of their product containing dried kelp. This product, merchandized under the trade name of "Manamar", contains several times the potential iodine contained in fish meal. Following are a few facts suggesting the high utility of this "gas-fired" product:

Fed to dairy cattle and poultry as a supplement to their regular grain diet the results are amazing. For instance, at the Rock River Farms in Illinois owned by Mrs. Ruth Hanna McCormick, "Manamar" for some time has been part of the diet of her famous dairy herd. Tests showed that the iodine of the feed was assimilated into the cow's system and through the blood-stream transmitted into the milk. Tests showed a sufficient iodine content in the milk to prevent goiter, which is a matter of vast importance in health matters in the entire Great Lakes and northwest regions. The herd is absolutely free from tuberculosis and the milk has the lowest bacteriological count of any milk produced in the United States.

At the Battle Creek Sanitarium 4,500 hens were recently placed on a Manamar ration. The birds are heavier, the egg-shells harder and one hundred and two more cases of eggs were laid in December, 1928, than in the same month of the previous year, from the same number of birds. The Sanitarium is now advertising iodized eggs.

J. M. Ballard of Marion, Indiana, who won the 1928 grand prize for fat hogs at the International Livestock Exposition fed them on a 15 per cent Manamar diet.

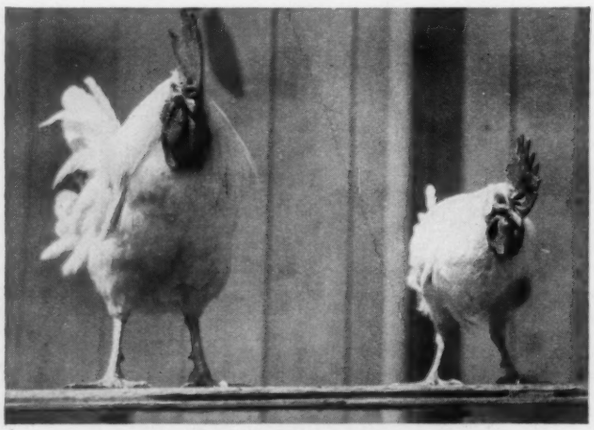
The company maintains a research department with laboratories at the plant where extensive experimental work is being carried on.

Kelp abounds all along the coast of Southern California and experiments have shown that the growth is about 50 feet in six months, so that the supply of raw material is practically unlimited.

A self-propelled harvesting barge brings the kelp to the plant. The barge is equipped with a cutter which can be lowered into the water about 10 feet and an endless chain conveyor by which means the cut kelp is brought on board. The load is about 40 tons to the trip.

A power fork operating on a crane lifts the material from the barge to a conveyor on the dock, which carries it to a

(Continued on Page 52)



"Manamar"—a poultry and dairy food containing dried kelp—accounts for the highly apparent difference in these two five-months-old white Leghorn cockerels, photographed at the "Manamar" research laboratory. The large, aggressive individual on the left, weighing two full pounds more than his comrade, was fed 10 per cent Manamar. Otherwise the diets of the two birds were identical.

The Developing Field of NATURAL GAS BY-PRODUCTS

By W. D. WILCOX
Consulting Engineer, Idaho Falls, Idaho

ABOUT two years ago *Western Gas* invited the writer of this article to contribute a discussion on the use of natural gas for production of ammonia and methanol. Following progress in his experimentation in this field Mr. Wilcox now supplies the accompanying article touching upon several aspects of the coming by-product industry—carbon black, ammonia, hydrogen, methanol, and several related products. Readers will not miss the strong case made for inherent economies in use of natural gas as a primary source for these essential commodities. Possibilities seen in the by-product industry for equating differences in market demands and gas production, and thus contributing to the paramount object of gas conservation, lend this subject added importance in the eyes of gas men.—*Editor.*

THE following discussion will be limited to uses of natural gas other than the generation of heat or power.

A very large volume of natural gas is annually consumed in the production of carbon black. By the more generally used Channel process, from 1 to 1.4 pounds of carbon black are obtained by the consumption of 1,000 cubic feet of average quality gas. Since carbon black sells for from 8 to 9 cents per pound at the plant, the producer cannot afford to pay more than 6c per 1,000 cubic feet for the gas, and to readily make a profit must obtain it for less. The carbon black industry is therefore carried on in localities where large supplies of natural gas have been developed so distant from any center of large population that its transmission is, for the time being at least, not practicable.

There are those who regard such use of natural gas as wasteful of an irreplaceable natural resource. It may be said in defense, that carbon black is necessary in the printing ink and color industries, so necessary that if no more cheaply manufactured product could be obtained, they would pay 50 to 60c or more per pound for gas black. These industries, and through them, the community at large, are fortunate in having so cheap a source of its supply in natural gas. But it does seem desirable that means be found of a more complete utilization.

There are in 1,000 cu. ft. of methane, the most abundant component of natural gas, 31.7 pounds of carbon. In ethane, just double this weight. Where less than 1.5 pounds of the total carbon are recovered in merchantable form, there is apparent a low percentage of efficiency in the procedure, which can only be excused when a thorough study of the problem shows it to be unavoidable.

It is well known that when hydrocarbon gases are exposed to a sufficiently high temperature, they are more or less completely decomposed, the carbon coming off as a solid, lamp black, soot, or carbon black; the hydrogen as a gas.

The result of a complete disassociation might be indicated by the equations:

CH_4 (methane) + heat = C + 2 H_2.
C_2H_6 (ethane) + heat = 2C + 3H_2.

At a quite early day, natural gas was used in admixture with steam in the production of a carburetted water gas, being passed through a bed of incandescent fuel and later enriched with oil vapors to produce a gas of higher candle power and greater usefulness in the days of the flat flame burner, prior to the general introduction of the Welsbach mantle. There is a considerable group of patents, disclosing apparatus and procedure for the decomposition of natural gas to obtain the carbon, the hydrogen being a by-product. In the earliest of these, natural gas was passed through an externally heated oven, the carbon which dropped out being periodically removed by a scraper operating within the oven. In 1913, Fernkes obtained a patent upon an electrically-heated oven used for this purpose. Ellis, U. S. 1,092,903-1914, obtained a patent upon an externally heated oven differing from the earlier types in that by use of surface combustion, higher heating temperatures could be attained. These earlier procedures were found not to produce carbon of a quality usable in place of the carbon black produced by incomplete combustion and deposition as soot upon a cool surface. There is another group of patents employing the passage of natural gas through incandescenct coke directed toward the recovery of hydrogen from natural gas, with the carbon a waste product remaining for the most part in the fuel bed and consumed in the subsequent blasting. None of these processes have come into any large use.

The most promising plant is one patented by Brownlee and Uhlinger in 1916. This plant follows closely in design the carburetor and superheater of a standard type water gas set. It is heated by burning natural gas with air in the checker brick filled interior. The air is then shut off and natural gas passed through the chambers in contact with the hot walls and checker brick at such a rate that a large portion of the released carbon is carried forward from these chambers by the current of gas, and may be recovered by deposition, by spraying with water, etc.

The writer is somewhat informed as to a plant operating this, or a quite similar procedure, in the Mid-Continent field. The large present use of carbon black in the manufacture of automobile tires appears to have improved the market for carbon black of the quality obtained in this way. This company is successfully marketing around 20,000,000 pounds of carbon black per year. The recovery per 1,000 cu. ft. of natural gas subjected to decomposition is from 12 to 14 lbs. The heavier portion remains in the heating chambers, and is consumed in the reheating cycle. The recovery per 1,000 cu. ft. of total gas consumed, including that burned to heat the chambers, is from 8 to 9 pounds. Unless some change in the procedure has quite recently been made, a very large volume of residual gas is discharged to waste. The natural gas used has the following analysis:

CO_2	.42
Illuminants (C_2H_6)	2.8
O_2	.28
CH_4	90.5
N_2	6.
	100.00

The residue gas, subsequently increased in volume, has the following analysis:

CO_2	0.36
C_2H_4	2.1
O_2	1.3
CO_4	1.36
CH_4	7.
H_2	82.14
N_2	5.74
	100.00

The writer is further informed that efforts have been made to establish a plant for the synthesis of ammonia utilizing this residual gas. A majority of those who will be interested in this discussion are no doubt familiar with the Haber process of ammonia synthesis. One volume of nitrogen, drawn from the air, united with three volumes of hydrogen, is passed through a conversion chamber in contact with a catalyst under pressures ranging from 200 to 900 atmospheres, and at temperatures of from 400 to 700 degrees C. Under these conditions, they unite to form ammonia, according to the equation

$$2N_2+3H_2=2\ NH_3.$$

Plants using hydrogen derived from coke oven gas or water gas, obtained as a by-product in chemical manufacture, or by the electrolysis of water, have been built and are being operated in all the industrial countries of the world. Nearly 1,000,000 tons of nitrogen fixed by this procedure were produced in 1928, and since the consumption of organic nitrogen is increasing at the rate of 100,000 tons a year, there will be further building of such plants.

It would appear from the fact that the Haber process had reached commercial development in 1912, that the basic patents have expired or will very shortly do so, and that while many improvements and modifications have been the subject of later patents, the process first made commercially successful is open to general use.

The hydrogen and nitrogen content of the residual gas, as indicated by the analysis given, could be made available for the synthesis of ammonia by a removal of the hydrocarbons and oxides of carbon. Removal of the hydrocarbons may be accomplished by liquefying the gas and taking advantage of the different temperatures at which they return to the vapor state after liquefaction. The CO_2 can be most readily removed by scrubbing with water or a solution of sodium carbonate. The CO, by scrubbing with an ammonia cuprous solution. (Its vapor point is so nearly that of nitrogen that separation by fractionation will be difficult). Liquefaction is an entirely practicable means of eliminating the hydrocarbon gas. It is the procedure followed for the recovery of hydrogen from coke oven gas in the Montcems process and by the Union Chemique Belge, at Ostende, Belgium (See Met. and Chem. Eng., Dec. '28, 741.)

The writer has during the last two years developed a procedure on which application for patent is pending, which he believes will be equally effective, less expensive, and more advantagous by reason of the greatly increased volume of hydrogen which is made available. It can be employed using natural gas, coal gas, or the hydrocarbon gases given off in the distillation of petroleum, and known as still gases. While no attempt will here be made to describe it in detail, it will be referred to briefly. As applied to the residual gas from the production of carbon black by thermal decomposition, the first step would be the addition of air, with some steam, in such a volume as to make the nitrogen content of the gas equal to one-third the volume of hydrogen in the final product. There are 4.2 parts of C in 2.1 parts of ethylene, 7 parts of C in 7 parts of methane. To oxidize the carbon atoms to CO will require 5.5 parts of O_2, and this will carry with it, as drawn from the air, 21 parts of nitrogen (N_2). The total of N_2 is still less than ⅓ that of the H_2 present in the residue gas, to say nothing of the addition to the volume of H_2 which will later result. The air introduced may be increased by 12.5 parts air (2.5 O_2, 10 N_2). The mixture of gases is now passed through the interior of a highly heated conduit. As a result of high temperature and some catalytic effect, the hydrocarbon gases are decomposed. The oxygen present unites with the carbon to form CO. Some small excess of oxygen above that required to oxidize the carbon will unite with hydrogen to yield H_2O, helping by that much to maintain the heat in the conduit. In carrying out this procedure, advantage is taken of the fact that at high temperatures, oxygen unites with carbon in preference to hydrogen. This is the basis of the familiar water gas process. The mixture leaving the conduit will be CO, hydrogen, and nitrogen. A large volume of steam is now added, reducing the temperature to around 500 degrees C., and the gases are passed through chambers in contact with an iron oxide catalyst. The following reaction occurs:

$$CO+H_2O=CO_2+H_2$$

The CO becomes for the most part CO_2 and the volume of hydrogen is now so increased as to be three times that of the nitrogen. The CO_2 can readily be absorbed out by water under pressure, or by an alkaline solution. The small percent of CO unchanged is removed by scrubbing with an ammonia cuprous solution.

This later procedure was first successfully employed by the Badische Analin and Soda Fabrik in treating water gas in order to secure a pure hydrogen. Like the Haber process, this procedure is no longer subject to unexpired patents, and may be used without the necessity of obtaining a license.

The procedure described may be applied to natural gas as it issues from the ground, or to still gases, steam being used as the source of such oxygen as cannot be drawn from the air without an undesirable increase in the proportion of nitrogen. Using for the sake of simplicity a natural gas assumed to be pure methane, 10.5 cu. ft. CH_4 (methane, plus 15 cu ft. H_2O (steam), plus 13 cu. ft. O_2 plus 12 cu. ft. N_2 (air), equals 36 cu. ft. H_2 plus 12 cu. ft. N_2, plus 10.5 cu. ft. CO_2. With the CO_2 absorbed out, 36 cu. ft. H_2 will unite with 12 cu. ft. N_2 to form the gas NH_3 (ammonia.)

12 cu. ft. Nitrogen weighs .8888 lbs.
36 cu. ft. Hydrogen weighs .1904 lbs.

1.079 lbs.

Some deductions must be made from the estimate of ammonia recovered to offset losses due to incomplete simplification, leakage and incomplete conversion, but figuring a reduction of 10 per cent, it appears that 10.5 cu. ft. of methane may be made to yield nearly a pound of anhydrous ammonia, selling in cylinders on the New York Market at 14c per pound.

The use of natural gas as the source of ammonia and other nitrogen compounds seems a very promising industry for establishment in many sections where there are abundant supplies of natural gas. It may be burned in gas engines to supply the power, as fuel to supply the heat required in the simplification process; with air and water added, it is the raw material of the synthesis. The margin of profit is so large as to permit the payment of a much higher rate per 1,000 cu. ft. than the producer of carbon black could afford to consider This will permit the industry to be established where the conditions of living, the supply of labor, and the means of transportation and sale are more satisfactory than in the remote localities where the carbon black plants are now established.

To get some idea of the advantage gained by using natural gas as the source of hydrogen, compare its cost produced in the way outlined with the cost of hydrogen obtained by the electrolysis of water. Assuming natural gas, equivalent to CH_4 to cost 16c per 1,000 cu. ft.

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The Compensation Plan Should Direct Sales Effort *toward* Profitable Load

By ROY G. MUNROE
Gas New Business Manager
Public Service Company of Colorado
Denver, Colorado

THE salesmen's compensation plan which may be relied upon to yield the best results is that one which most nearly and most obviously maintains identical the interests of the company and its salesmen. The compensation system should automatically direct the efforts of the sales representatives along the paths most beneficial to the company. Nor does this line of reasoning ignore the fact that in the final analysis the interests of the company and of its customers are also identical.

The simplest form of compensation, and the least expensive to administer, is the flat salary. With constant attention, frequent readjustments, and superlative judgment on the part of sales management, excellent results may be accomplished. But the flat salary plan is too inflexible, and demands too much attention from sales executives whose energies should be conserved for other important activities by every possible automatic feature.

The employee who works in the office, at the plant, or in the open, with fixed working hours, at an established rate of performance, and under more or less constant supervision, functions fairly satisfactorily when paid a flat wage per day or per month. But the salesman who goes out of the office and beyond the sight and the direct supervision of his employer, and who must generate his own driving power and enthusiasm, and boss his own efforts unassisted for hours and days at a time, needs a most flexible and skillfully-planned compensation schedule. He needs a pay plan which rewards good performance swiftly, and surely, and spectacularly; a plan which is simple and easily understood, but which premiumizes every detail of a good job well done.

In Denver we have tried many compensation methods since Henry L. Doherty first inaugurated intensive house-to-house solicitation 30 years ago. We have learned that a plan may be perfect in theory, but in practice so difficult to understand, and so expensive to administer, as to be worthless. On the other hand, we have found that a simple and easily administered plan, such as a fixed percentage on gas-consuming merchandise, frequently directs the efforts of the salesmen into most undesirable channels.

PERHAPS no utility in the country can claim a more aggressive record of gas appliance sales promotion than can the Public Service Company of Colorado. With the shift from manufactured to natural gas service on completion of the Texas-Denver gas line this company faced the choice of increasing gas sales or seeing its revenue dwindle with lowered rates. Redoubled sales effort was the answer.

R. G. Munroe

Pacific Coast Gas Association men attending their Northern Conference at Victoria, B. C., June 7-8, heard Mr. Munroe deliver the paper published in these pages, in which he tells of the Denver utility's varied experiences with salesmen pay methods and describes in some detail the system which has been working out so successfully for the company since January 1, 1928. Denver gas appliance salesmen, under the guidance of this system, are not only selling more merchandise but are increasing net profits—in other words, they are becoming good merchants.—*Editor.*

As a result of our experiences and needs, we devised in Denver during 1927 the plan of salesmen's compensation which has been in effect in our Gas New Business Department since January 1, 1928. In outlining this system we first gave careful consideration to the fundamental objectives of the sales department of a gas company. These we hold to be as follows: The securing of a maximum and satisfactory volume of additional gas gross revenue, of the best possible load characteristics, at the minimum sales costs per dollar, together with the constant improvement of public relations and of service to customers.

We attempted to devise a pay method which would cause the sales representative to realize himself as a partner in the business, and which would so broaden his viewpoint as to enable him to distinguish good business from business not so desirable. We sought to attract the best of sales talent by attractive and unlimited earnings to the extremely capable salesmen, and with a substantial minimum guarantee as protection over periods of illness, vacations, territory re-assignments, etc.

The plan is as follows:

First: A substantial monthly drawing account or guaranteed minimum against which all commissions are applied.

Second: A revenue or load-building commission varying in amount according to the gas revenue value of the equipment sold, taking into consideration annual gross revenue, annual net revenue, and load characteristics.

Third: A percentage of the gross profit resulting from merchandising sales.

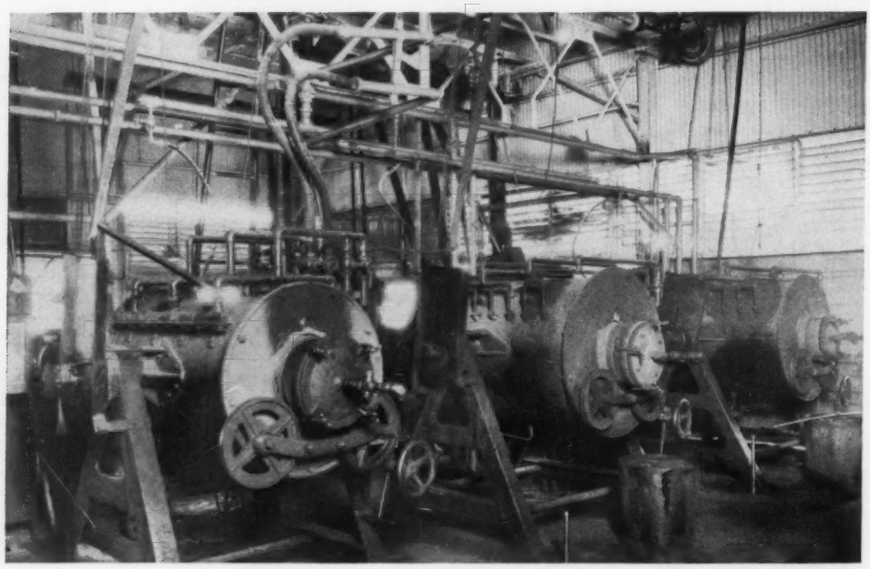
Fourth: A percentage of all cash down-payments collected with orders.

Fifth: Special temporary bonuses or penalties applied or taken off at any time for such purposes as special drives on certain appliances, introduction of new equipment, the disposition of obsolete stock, or the penalizing of certain undersirable merchandising activities.

By gross profit is meant the difference between the selling price of a given piece of equipment and the total costs of appliances and installations. These costs include such items as freight, cartage and fitting-shop expenses, but do not cover such expenses as commissions, office expense, advertising, etc. Refunds resulting from the adjusting of misunderstandings with customers are charged against the salesman's gross profit for the month, as well as all losses and depreciations in connection with returned appliances.

Paying a portion of the merchandise gross profit to the salesman improves his ability to overcome customers' objections, surmount obstacles, better his selling technique and make of himself a better business man. We have observed that requests for larger allowances on old equipment taken in on exchange for new merchandise have almost disappeared. It is now common practice to give allowances for old appliances much less than the maximum permitted in the company's schedule, whereas, when these same men were on a straight merchandise commission, continual pressure was brought to bear upon department heads to O.K. larger trade-in allowances. Under a straight merchandise commission there is a tendency on the part of most salesmen to feel that

(Continued on Page 51)



Battery of gas-fired rotary carburizing furnaces

Gas *in* *of*

By ROBERT G. GUTHRIE

A PAPER dealing fundamentally with this subject must, to be useful, rely more upon practical results than theoretical calculations.

What is meant by carburization of iron or steel? The process of increasing the carbon content of the surfaces of iron or steel products to various depths without changing their shapes or dimensions and at temperatures below the melting points of the iron or steel is known as carburization. This process has been variously known as case hardening, cementation, case carburizing, carbonizing, etc. The depleting of the carbon content in the surface of iron or steel is known as decarburization and is obviously the opposite of carburization.

AN ANCIENT ART

Historically, carburization under the name of cementation was used long before practically any of our present day steel treating processes were known. It even far antedates the melting of iron to make steel. Yet throughout all this time it had progressed but feebly to within very recent years. Most of the information concerning it was handed down from father to son and from one generation to the next as an art and could not by any stretch of the imagination be called a science.

For many years the process was looked upon as having been about exhausted of further possibilities. It was common belief that steel or iron parts heated in most any carbonaceous material for sufficiently long periods and at most any temperature above 1600 and below 1900°F. would be satisfactory. The controlling of the depth of case roughly was generaly considered satisfactory. The thought of ever controlling the case depth accurately upon all pieces, or the controlling of the amount of carbon in the case (carbon concentration) was mostly only a vague hope when it was thought of at all.

In the last few years, carburizing has made great strides both as regards improvements in the process itself, as well as the finding of new and greater applications for it. One of its greatest fields is in the manufacture of races and rollers for roller bearings and races for ball bearings and thrust collars, cam shafts, wrist pins, and a host of other parts for internal combustion motors, gears of every size, sort and description and literally thousands of other parts.

A properly carburized and heat treated part has many points of superiority over the same part made throughout of high carbon steel.

CARBON CONCENTRATION

At this point it should be understood that a part having a 1/16-inch case will not possess the same carbon concentration in each unit of measurement through that case's cross section.

For many years it was thought that for a given depth of case the carbon content would be about the same in all steels and with all carburizing media. Such is not the case. It is true that most of the compounds used do give about the same carbon concentration for a given depth of case, but this is not to be wondered at when it is remembered that, also, most of the compounds evolve roughly the same type of gas when heated to the carburizing temperature.

Steel or iron heated to above 1500°F. will absorb, more or less readily, many gases with which it comes in contact. If the gas be a complex one such as some of the hydrocarbons, the hot steel has the property of helping the disintegration of such a gas into its component parts, some of which it may absorb, similar to the absorption of water by a blotter. Although the physical mechanism of this absorption is not a true analogy to the carburization of iron or steel, nevertheless it will do for the time being.

The relation of "case carbon concentration" to "depth of case" for any given steel is not fixed and the one may be quite independent of the other providing the equilibrium of the carburizing medium in contact with ferrous material is understood. The fact that the one seems to be a function or consequence of the other has previously been explained.

Now it must be clearly understood that solid carburizing compounds exert no carburizing effect in themselves, but must be gasified before the carbon in their evolved gases can be selected and taken into the surfaces of the steel.

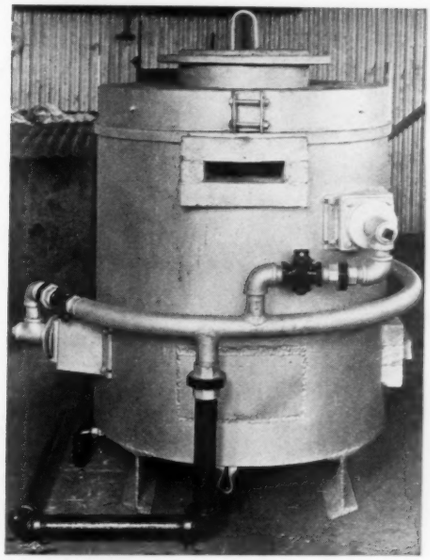
The situation is analogous to the combustion of solid or liquid fuels, as it is well known that coal or oil will not burn or combine with oxygen to produce heat until small quantities of them have first become raised enough in temperature to evolve their gases.

THE PACK METHOD

This fact strongly mitigates against the use of the pack method of carburizing with gases evolved from solid compounds in that very little carburizing of steel will be accomplished below 1500°F., while the compound begins to readily evolve its gases at around 1000°F. This fact, coupled with the fact that compounds are excellent insulators, due to their physical makeup,

the Carburization Iron *and* Steel

Metallurgist, Industrial Department
*The Peoples Gas, Light & Coke Company, Chicago, Ill.**



Vertical gas-fired carburizing furnace

cause two additional troubles as follows: The parts must be packed in layers of some sort with compound between; obviously, all the parts cannot be the same distance from the surface of the box or pot which is the source of heat to them; quite as obviously, the parts will not all reach their proper temperature nor remain at these temperatures the same length of time, with a resultant variation in quality of the cases obtained. This constitutes a serious objection. The second difficulty is indigenous to the pack method particularly. It is this. The steel parts must not touch each other for very long at a time and inasmuch as each must be separated from its neighbor, a layer of compound is the logical separator. This results in a very costly condition in both compound and fuel necessary to heat through such a large mass as the container and the insulating compound—with a comparatively small yield of parts. The labor of carefully packing such pots and the life of the pots themselves makes the process a very crude and expensive one. When the non-uniformity of heating such an affair, as well as the fact that the bottom, middle and top pieces each carry a different physical load at elevated temperatures is reflcted upon, no comfort can be expected regarding the non-warping qualities of the parts when the box is opened.

A word about the warping of the average sectioned piece during carburizing: About the only conditions necessary in order to avoid warping are absolute uniformity of heating and cooling and freedom of action for the piece. Likewise if these conditions are interfered with, darpage will occur in direct proportion to the neglect.

The biggest point in favor of the box pack method of carburizing is that for a long time it was the only method known for producing an appreciable carburization. It is an easily understood process and consequently quite fool-proof and anything possessing these two points is usually readily seized upon.

Within comparatively recent years, a method of carburizing having none of the faults of the pack method has come into use. This method is generally known as the retort, or sometimes rotary retort method.

USE OF GAS METHOD

Briefly, the average size furnace consists of a large cylindrical retort of one of the nickel chromium alloys about 15 inches by 48 inches inside dimensions. This retort has a small gas inlet in the back and a readily removable gas tight cover over the front. This cover has a small gas cock and outlet pipe in its center.

The entire retort rests upon wheel supports and is surrounded by a cylindrical gas heating chamber. In the rotating type this retort is slowly turned or rotated by a small electric motor that turns the retort at various speeds of from one-fourth to two revolutions per minute. This rotation is important from the standpoint of the quality of the work. It prevents warpage. It obviates the necessity for packing the work and contributes greatly to the uniformity of case.

The carburizing medium may be special or city gases, or gas evolved from small amounts of compound thrown into the retort.

Inasmuch as the retort is gas tight and the work is allowed to slowly move with the rotation of the retort, almost any type of carburizing medium may be used.

In using compound in such a furnace, the work is first charged and brought up to heat. The door is opened and a standard type compound in the proportion of one pound of compound to every 30 to 50 pounds of steel is charged, after which the door is closed and the front vent opened to permit the escape of steam. This is then closed and the carburization proceeds. Due to the rapid heating of this furnace, a retort load of parts which will weigh about 600 pounds may be brought from room temperature to 1650°F. in from 1¼ to 1¾ hours. This furnace consumes 500 cubic feet of 535 B.t.u. gas per hour and the retorts are guaranteed for 5000 hours.

GAS AS CARBURIZING MEDIUM

By using city gas as the carburizing medium, even cheaper operation is possible. The labor charge is extremely small, as one man can charge and discharge the furnace in 10 minutes—total time. This means a handling of 1200 pounds of work in 10 minutes.

It is hoped that the reader is now familiar with the major points of the two processes and if such is the case a discussion of some of the more technical points of carburizing with city gas may be entered upon.

For the sake of simplicity, a typical mixed coke oven and blue water gas of about 535 B.t.u. will be used. The same points made regarding this gas will hold fairly true for the majority of city gases. A typical analysis is:

	Per Cent
Carbon Dioxide	2.8
Illuminants	4.2
Oxygen	1.
Carbon Monoxide	11.
Hydrogen	47.2
Methane	22.4
Nitrogen	11.4

Ordinarily in attempting to use this gas for carburizing the difficulties encountered are: (a) too low a pressure; (b) large deposits of soot occur

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*Presented before the 1929 Western Metal Congress held at Los Angeles under the auspices of the American Society for Steel Treating.

PACIFIC COAST GAS ASSOCIATION

447 Sutter Street, San Francisco, California

A Department Conducted by Clifford Johnstone, Executive Secretary

Reviewing the Northern Conference

WITH a registered attendance of 82, and over 100 members and guests partaking together at both lunch and dinner on the opening day, the annual Northern Conference of the Association at Victoria on June 7 and 8 proved to be a decidedly enjoyable and instructive affair It was marred only by the absence of our beloved President, Chas. H. Dickey, whose health did not permit of his taking such a long trip.

F. H. Bivens, vice-president of the Association, presided at all meetings in a masterly manner and added a great deal to the discussions by his comments drawn from his long experience as a gas company executive.

All of those in attendance remarked on the hospitality of the officials of the British Columbia Electric Power and Gas Company, headed by Messrs. Goward and Hewlings, and including Messrs. Halls, Taylor and Wellwood. The same courtesy was later extended to many of us in Vancouver by Mr. Keillor and Mr. Fremont.

Address of Welcome

The meeting opened with a welcome to Victoria by His Worship, Herbert Anscomb, Mayor of the city. He was followed by A. T. Goward, vice-president of the British Columbia Electric Power and Gas Company, who welcomed the visitors on behalf of the company and gave an interesting history of the gas business on Vancouver Island. The Victoria Gas Company was organized in 1860 by local capitalists, the machinery being brought around the Horn from Scotland. The company is still operating under the original act which permits it to charge $7.50 per thousand cubic feet, although the actual rate now is about one-tenth of this amount.

Cooperative Advertising

Following Mr. Goward, the secretary made the first public announcement of the plans for cooperative radio and trade journal advertising to be started by member companies of the Association in August as outlined in the June number of *Western Gas*. The plans were endorsed by the meeting and the Secretary later received pledges of wholehearted support from all Northwst companies.

Rates

Will T. Neill's paper, "The Effect of Rate Structure on Sales", was read by J. Earl Jones. Mr. Neill stated that the possibilities for the sale of gas are inextricably tied in with the form of rate structure. Our aim is to make a reasonable profit after meeting operating expenses, depreciation and taxes. If we do this through rate structures which encourage a complete, effective and economic use of our facilities, we establish our companies on a substantial foundation.

The weakest link in the rates of most companies is the rate for residential service. In many forms the minimum or initial charge is too low to properly support the service rendered the convenience user, and in addition the rates lack inducement features to impel customers to a more extensive use of gas for general residential purposes.

The Portland Gas and Coke Company recently has revised its rates as a first step toward this end. The former rate structure had three major schedules; one for all ordinary residential, commercial and industrial burners, the second a househeating rate and the third a special schedule for seasonal off-peak commercial waterheating. This has been changed to a structure containing eight schedules in which residential, commercial and industrial business are entirely divorced. The principal departure from previous practice is the establishment of a one-meter combination service rate available only to customers using gas for cooking, waterheating and househeating. This rate carries a minimum monthly charge of $5.00, but breaks sharply from $1.095 per M after the first 4,000 cu. ft. to $0.765 per M for the next 4,000 cu. ft., and $0.565 per M for the excess.

The commercial and industrial schedules are an experiment in optional class rates. Special optional rates are available for drying and enameling processes, metal melting and heat treating, and for industrial waterheating and steam production. Off-peak rates are under consideration.

Salesmen's Compensation

This subject was discussed by Roy G. Munroe, gas new business manager of the Public Service Company of Colorado at Denver. Mr. Munroe's paper is published on another page of this issue and describes the compensation plan used successfully by the Denver company in increasing its business along profitable lines.

Group of P. C. G. A. members and visitors attending Northern Conference at Victoria, B. C., June 7-8.

Optimism for the Future Shown at Luncheon Talks

The feature of the noon luncheon was a series of inspirational talks by executives of Northwest companies. While all speakers recognized the highly competitive nature of the gas business and deplored the extreme conservatism of the industry which in the past has tended to encourage this competition, there was a uniformity of opinion that the future is exceedingly bright. W. B. Addy of the Seattle Lighting Company quoted statistics to show the indispensable economic service the gas company renders to the community. John Hartog of the Portland Gas and Coke Company spoke eloquently on the quality of Enthusiasm. R. W. Coblentz, Washington Gas and Electric Company, called attention to the success which had resulted from the introduction of proper rates and intelligent sales policies, and a telegram from H. M. Thomas, Northwest Cities Gas Company, urged the maintenance of high standards of service and appliance quality.

Domestic Sales

The afternoon session opened with a progress report on the work of the Domestic Sales Committee prepared by its Chairman, A. P. Stryker, Pacific Gas and Electric Company. The committee finds that there is not sufficient information available to reach a conclusion as to the trend of the domestic load. There are many opinions, justifications and alibis but no real facts. This in itself is a severe indictment of the industry and the efforts of the committee are being directed to the establishment of a fact-finding system covering domestic consumption, the unsold field, economic trends, merchandising, and competition.

Sales Budgets

C. R. Miller of Portland, chairman of the Sales Budget Committee, made a thorough and able report on this subject. The time available did not permit of a complete discussion so this report will be again up for discussion at the convention. The report stresses the value of maintaining a budget, and suggests classifications and forms. It will appear in full in *Western Gas'* September issue.

Appliance Sales

In discussing the sale of gas appliances, A. A. Knoernschild, Seattle Lighting Company, stressed the fact that nobody wants gas for its own sake but for what it can give them in the way of service. This puts the burden of gas sales strictly upon the appliance and makes it essential that gas companies be

(*Continued on Page 72*)

Radio and Industrial Publicity Plans Are Now Definitely Formulated

By D. L. SCOTT
Chairman Executive Committee on Cooperative Gas Advertising, Pacific Coast Gas Association

WESTERN GAS for June carried a rather complete general outline of the cooperative gas advertising activity which will become effective in August. It is felt, however, that this activity has such a vital bearing on the welfare and future development of the gas industry on the Pacific Coast that all the members of the industry will be interested in following the progress of the campaign as it develops.

D. L. Scott

In this issue we are able to give more in detail the schedule of the radio advertising and also of the trade journal advertising to a selected group of industries.

The first eight radio talks have been developed to the point where they are practically complete, and preliminary work has been done on certain other ones. These talks are prepared by the agency with the cooperation of the committee and are given a very thorough scrutiny before they are approved. They will be broadcast exactly as written, by Helen Webster over the National Broadcasting Company's Pacific Coast network. Each talk will constitute a "chapter" of the Women's Magazine of the Air. The broadcast period will be from 10:50 to 11:10 a.m. each Wednesday, beginning August 14 and continuing for 26 consecutive weeks.

The companies will give publicity to the radio broadcasts by means of various forms of tie-in advertising. Window and counter cards are being prepared, also small newspaper advertisements which may be used by various companies at their own pleasure. In addition to this, it was agreed by the members of the committee that they would publicize the broadcasts by printed matter to be distributed to their own consumers.

The broadcasting will be done in the name of "Your Own Gas Company," and not in the name of the Pacific Coast Gas Association. This will be done so that any consumer requests can be directed to the supplying company without confusion.

An important feature of the plan is the preparation, by an expert, of an inexpensive book of recipes, menus, and general information for the care and operation of gas appliances in the home. This book will be distributed, at first, in response to requests from radio listeners only, and will thus serve the double purpose of distributing valuable information and of checking up on the effectiveness of the radio advertising. The cost of preliminary work on the booklet will be defrayed out of the funds already pledged, leaving only the printing costs to be borne by the companies distributing the book.

The schedule of broadcasts, up to October 16, follows:

August 14—"Gas, the Modern Fuel for Modern Homes."
August 21—"Oven Canning."
August 28—"Cooking—Gas Stoves, General."
September 4—"Gas—Oven Heat Control."
September 11—"Gas Refrigeration."
September 18—"Oven Cooked Meals."
September 25—Open.
October 2—"House Heating."
October 9—"Fireplaces."
October 16—"Heating Individual Rooms."

Radio broadcasting was selected as the medium for reaching the domestic consumer on a cooperative basis. Trade journal advertising has been selected for the cooperative exploitation of the industrial gas field. Publications to cover the Pacific Coast in the industries of machinery, building, baking, confectionery, plumbing and heating, and restaurants, hotels and caterers, have been chosen as the vehicles to carry the mes-

(*Continued on Page 73*)

P. C. G. A. Thirty-Sixth Annual Convention
September 10-13
Del Monte, Calif.
SAVE THE DATE

Practical Steps *in* Pioneering *the* New Gas Line's Load

By W. F. SUESS
Sales Supervisor, Eastern Division
Southern California Gas Company

TACT — enthusiasm — good public relations. These are among the constituents which bring success to any gas "pioneering" project. Mr. Suess expresses some plain truths in this discussion of general methods followed by one company in entering new territory, and his observations will be found applicable wherever gas companies are called upon to make main extensions.— EDITOR.

NATURAL high pressure gas of high heat value in abundant quantities, affords us an ever-widening field of operation.

The gas industry in Southern California is confronted with the problem of keeping pace with the rapid growth of territory adjacent to our existing mains. To judiciously handle this problem, it is necessary that we steer a careful course between the two extremes, namely that we do not invest money which will not show a proper return and that we do not delay until our competitors have saturated the territory with their commodities.

Obviously either course will cost the gas company a great deal of money, unless the main extension is correctly timed.

Periodically, surveys are made in new territories. This survey is made as far as possible without contacting the prospective customers and each piece of business is spotted on a map, together with an accurate description of the business. Casual conversation with some of the larger prospects, without our representative giving out his business connection, elicits further information.

This survey enables us to convey a true picture of exact conditions in the field to the management. An analysis based on estimated revenue, showing the approximate percentage of return on investment, together with data regarding rate of growth, future prospects, financial conditions, water conditions of the territory, seasoned with judgment, enables us to decide when the correct time has arrived to recommend the extension.

A DEFINITE SURVEY

Before recommending the extension, a more accurate survey is necessary. A company representative interviews each customer along the proposed extension and determines just what he will use gas for, together with quantities and costs of present fuels used. This representative morally obligates the customer to use gas in the applications in which he states he will use it, and gives him a rough outline of the company's requirements for service. He further offers the assistance of our sales engineers to give expert advice on the most economical manner of applying gas for fuel. At this step, the representative conveys the idea that he is merely making a survey to determine the advisability of extending gas into this territory and explains that most of the responsibility rests with the customer, as to whether the extension is made. He points out that the amount of main we can install is proportional to the consumption that we may expect.

A second analysis of cost vs. revenue is made and should the return justify the extension, authorization is secured to proceed with the work.

A sales representative then calls on each customer and secures his application for gas service, signs contracts for the purchase of appliances, retaining all paper work. The salesman reports to his superior the business that he has secured. If a number of people have changed their minds about using gas service, the extension is held for further sales work. Often it is explained to active customers adjacent to them, that the extension has been held until more business can be obtained. This invariably arouses the community, which brings pressure to bear on the delinquent members and assists us in selling gas.

Should we be unable to secure enough business on the proposed extension to justify the extension at this point, it can be turned down, explaining to the people who have supported us, that insufficient business was obtained. This places the responsibility for their failure to get gas upon the delinquent citizens, against whom the ire of the community is directed, eventually helping line up the business and leaving the gas company in the clear for a future extension.

If the extension was justified by the business obtained, the necessary deposits, on appliances and service, are collected and construction work proceeds.

PSYCHOLOGICAL SALES

During construction work, intensive sales effort is applied to sell all of the gas burning equipment that we can, during the wave of enthusiasm that psychologically follows.

Prospect cards for follow-up calls are made out for all customers who will need additional appliances in the future. This manner of handling most of our extensions is generally followed.

Obviously special conditions will arise which make it necessary that we vary our procedure.

Recently an extension was made, which extended a distance of 15 miles through an agricultural district and terminated in a town of 250 homes.

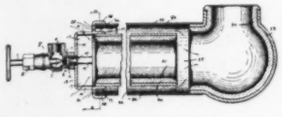
The preliminary survey showed that the extension was justified, providing that we secured most of the pumping load adjacent to the extension and all of the domestic business. A large portion of the people in the town had never used gas before, electricity and oil being in general use. The idea of gas service was placed with the proper parties and they called upon us and placed a request for gas service, pledging the support of the Chamber of Commerce and the community. After a tactful wait, they were advised that the gas company, believing in the future growth of their community, would proceed to serve gas, providing of course, that we secured their business. In keeping with this agreement the leading business men offered their business and the city pumping plant was changed to gas engine power.

In this case, it was necessary to serve the city first and then concentrate on

(Continued on Page 49)

THIS MONTH'S PATENTS PERTAINING TO THE INDUSTRY

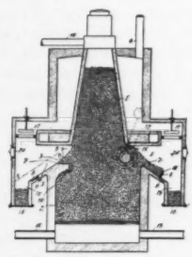
1,702,642. HEAT GENERATOR. HENRY C. CALDWELL, Buffalo, N. Y. Filed Sept. 9, 1924. Serial No. 736,718. 2 Claims. (Cl. 158—99.)



1. A heat generator comprising a gas control valve provided with a body which is formed with an uninterrupted gas orifice and a valve air opening located immediately in front of the gas orifice, a solid needle valve for controlling the size of the gas orifice, a generator head carrying the valve and formed with intermediate-air openings and with a plurality of auxiliary air spaces, a low pressure combustion chamber carried by the head and located immediately in front of the valve air opening, an intermediate pressure combustion chamber carried by the head and in communication with the intermediate air openings of the head, a jacket carried by the head and arranged in interspaced relation with the intermediate pressure combustion chamber and in front of the auxiliary air spaces of the head, and a high pressure combustion chamber carried by the forward end of the jacket and having its rear end arranged in interspaced relation with the forward end of the intermediate pressure combustion chamber.

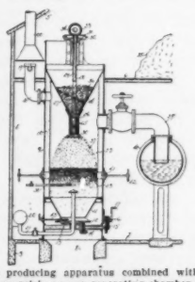
1,691,636. APPARATUS FOR PRODUCING GAS AND COKE IN ALTERNATELY-WORKING WATER-GAS GENERATORS. ALBERT BREISIG, Vienna, Austria. Filed May 4, 1926, Serial No. 106,742, and in Austria May 7, 1925. 6 Claims. (Cl. 209—9.)

1. In a combined coking retort and gas generator comprising an enlarged lower part and transversal channels branching off from the junction of the upper and the lower part and constituting the out-let for the blow gases the inclination of the bottom of these channels slanting outwardly and the disposition of the bottom edge of the chan-



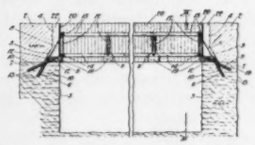
nels orifice at such height, that it lies approximately in the plane of the slope naturally formed by the coked material when settling in front of the orifice.

1,689,159. GAS-PRODUCING APPARATUS. WILBUR L. SHEPARD, West Hartford, Conn., assignor of one-half to Edward A. Beals, West Hartford, Conn. Filed June 11, 1925. Serial No. 36,346. 3 Claims. (Cl. 48—86.)



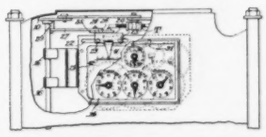
2. A gas producing apparatus combined with a fuel feeder and comprising a gas generating chamber arranged for the partial combustion of material therein, means for feeding air for combustion purposes into said chamber, a hopper opening into said gas generating chamber, a worm located in said hopper, a hollow shaft to which said worm is secured, means secured to said shaft to rotate it, a valve stem projecting through said hollow shaft, a valve secured to the lower end of said stem to close the opening from the lower end of the hopper, and means located on said stem to close said valve.

1,696,421. METHOD OF AND APPARATUS FOR SUPPORTING THE SIDE WALLS OF EXCAVATIONS. SAM HOUSTON SHOWELL, McKees Rocks, Pa. Filed Mar. 21, 1928. Serial No. 263,249. 8 Claims. (Cl. 61—41.)



1. The method of preventing the caving in of the side walls of excavations, which consists in removing the earth from the excavation for a predetermined depth, then forming holes downwardly and outwardly on an angle from the base of the preformed excavation at a plurality of spaced points along the sides thereof, then securing tie-rods in said holes, then positioning wale-members along the side walls of the preformed excavation and securing said wales to said rods, then driving sheeting home between the side walls of said excavation and said wales, and then continuing said excavation to the desired depth without further shoring or support.

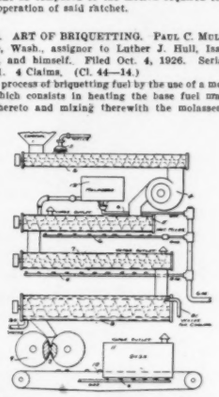
1,700,845. GAS-METER-INDICATOR MECHANISM. ERNEST ARTHUR KERSTEIN, Brooklyn, N. Y., assignor to American Meter Company, Incorporated, New York, N. Y., a Corporation of Delaware. Filed July 29, 1925. Serial No. 46,925. 3 Claims. (Cl. 73—1.)



1. In a gas meter the combination of a flag arm, registering mechanism including a ratchet rotatable in one direction only, an indicator and pawl carrier mounted for reciprocatory motion, an indicator secured to said carrier, a pawl pivotally mounted in said carrier in position to periodically engage and actuate said ratchet, detent means for limiting the extent of movement of said pawl in both directions, and a link and lever connection between said flag arm and said indicator and pawl carrier to impart to the latter a reciprocatory sliding movement of exaggerated extent as compared to the motion required to effect unitary operation of said ratchet.

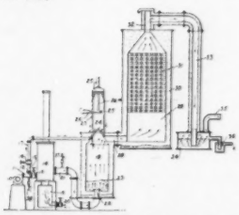
1,683,094. ART OF BRIQUETTING. PAUL C. MULLIGAN, Seattle, Wash., assignor to Luther J. Hull, Isaac M. Foster, and himself. Filed Oct. 4, 1926. Serial No. 139,381. 4 Claims. (Cl. 44—14.)

1. The process of briquetting fuel by the use of a molasses binder which consists in heating the base fuel material, adding thereto and mixing therewith the molasses, con-



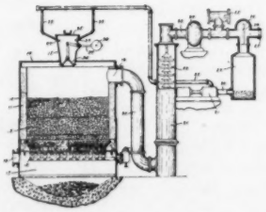
tinuing heating of the mixture to drive off the water contained in the molasses, but maintaining the temperatures throughout below that required to drive off the volatiles, cooling the mixture to a briquetting consistency, pressing the mixture, and finally baking the briquettes to carbonize the binder.

1,703,506. CONTINUOUS OIL-GAS PROCESS. WILLIS S. YARD and EARL N. PERCY, San Francisco, Calif. Filed Dec. 1, 1924. Serial No. 753,157. 2 Claims. (Cl. 48—213.)



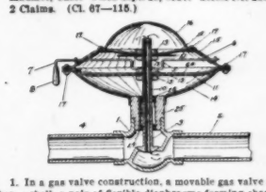
1. A method of making oil gas mixed with producer gas in an oil carbon gas producer, which consists in maintaining a deep bed of fuel in the producer at incandescence by admission of air thereto, introducing oil periodically and successively into said producer at a plurality of fixed points above the fuel bed to thereby continuously replenish the fuel bed successively in different parts of the fuel bed by the deposition of carbon formed by the cracking and distillation of oil in producing the oil vapor and gas, and controlling the oil being deposited successively upon different parts of the fuel bed so that the fuel bed will be uniformly replenished while maintaining the optimum temperature within the producer.

1,699,166. GAS-PRODUCING APPARATUS. HARRY F. SMITH, Dayton, Ohio, assignor to The Gas Research Company, Dayton, Ohio, a Corporation of Ohio. Filed Sept. 20, 1921. Serial No. 501,886. 4 Claims. (Cl 48—86.)



1. In apparatus of the character described, comprising a gas generating chamber adapted to contain a fuel bed; fuel feeding mechanism comprising, in combination, a hopper member, means for introducing solid carbonaceous fuel, such as coal, into said hopper member; means for introducing liquid hydrocarbons, such as tar, into the hopper member; means within said hopper member for distributing the tar uniformly throughout the mass of fuel within the hopper member to provide a coating of liquid tar on said fuel; and means for introducing the admixed fuel and tar into the gas generating chamber.

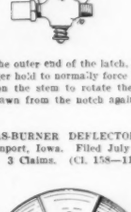
1,703,570. GAS SAFETY VALVE. EDWARD E. BOECK, Maumee, Ohio. Filed Sept. 22, 1927. Serial No. 221,219. 2 Claims. (Cl. 67—115.)



1. In a gas valve construction, a movable gas valve member, a shell, a pair of flexible diaphragms forming chambers in the shell, a hollow stem connected to the movable gas valve member and to the diaphragms, one of the chambers communicating with the outlet side of the gas valve and the other of the chambers communicating with the inlet side of the gas valve through the stem.

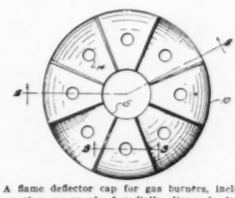
1,689,657. LOCKING VALVE FOR GAS BURNERS. CHARLES E. WISE, Philadelphia, Pa. Filed Aug. 1, 1927 Serial No. 209,772. 1 Claim. (Cl. 251—164.)

A locking valve for gas burners comprising a valve body having a slot and notch in its upper edge, a valve stem, a pin projecting from the stem into the slot, a guideway longitudinally of the stem, a lug at the outer end of said guideway, a latch slidably mounted in the guideway and provided with a nose for registration with the notch when the valve stem is in a closed position and riding on the edge of the valve body when in other positions, a



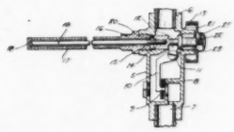
finger hold at the outer end of the latch, a spring between the lug and finger hold to normally force the latch inward, and a handle on the stem to rotate the same when the latch is withdrawn from the notch against the action of the spring.

1,709,116. GAS-BURNER DEFLECTOR. CHARLES C. CLARK, Davenport, Iowa. Filed July 6, 1928. Serial No. 290,815. 3 Claims. (Cl. 158—113.)



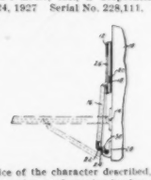
1. A flame deflector cap for gas burners, including a body portion composed of radially disposed alternately raised and lowered connecting segments, said alternately disposed segments providing radially disposed passage ways whereby complete combustion of the gas is facilitated, and an orifice centrally disposed in said body.

1,703,283. GAS-REGULATING VALVE. JAY HARLEY SMITH, Glendale, Calif. Filed Aug. 1, 1927. Serial No. 209,866. 1 Claim. (Cl. 236—102.)



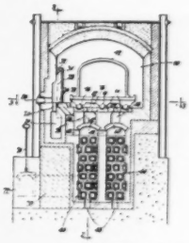
A thermostatically controlled valve including a valve housing having a valve seat, a copper tube connected with the valve housing, a rod having a threaded end portion, mounted in the tube, a movable member having a peripheral groove and having a threaded opening to receive the threaded end of the rod, a valve pivotally mounted in the valve housing and adapted to move against the valve seat to control the passage of gas through the valve housing, said valve having an arm formed with a head fitted in the groove, to move the valve with the rod, and means disposed exteriorly of the valve housing to adjust the normal position of the valve.

1,702,517. OVEN-DOOR REST. GUILFORD S. MORLEY, University City, Mo., assignor to Majestic Manufacturing Company, St. Louis, Mo., a Corporation of Missouri Filed Oct. 24, 1927 Serial No. 228,111. 3 Claims. (Cl. 126—190.)



1. In a device of the character described, a hinged door provided with an elongated opening having a wall in which a slot is formed, said slot being of less width than said elongated opening, a rest to limit downward movement of said hinged door, a portion of said rest at one end thereof being extended through said slot and disposed within said elongated opening, said portion of said rest within said elongated opening being incapable of passing through said slot when said rest is in its normal position, and said rest being movable to bring said portion to a position where it will pass through said slot to disengage said rest from said hinged door, and a saddle mounted in a fixed position below the hinged door and adapted to removably support said rest.

1,688,393. FURNACE. FORREST WILLIAM MANKER, Jackson Heights, N. Y., assignor to The Surface Combustion Company, Inc., Toledo, Ohio, a Corporation of New York. Filed Sept. 12, 1925. Serial No. 55,930. 6 Claims. (Cl. 263—28.)

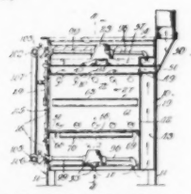


6. The combination with a heating chamber, of a work-holding carriage within the chamber, means for confining said carriage to a path of travel which is nearer one side wall of the chamber than the other, a wall extending upwardly from the floor of the heating chamber in spaced relation to that side of the chamber which is the more remote from said carriage, said wall terminating short of the roof of said chamber and constituting with the adjacent side wall a combustion chamber, and means for entering combustible gases into the combustion chamber.

1,702,653 GAS IGNITER. LEO JUNGMANN, Offenbach-on-the-Main, Germany. Filed Apr. 14, 1927. Serial No. 183,741, and in Germany Apr 24, 1926. 3 Claims. (Cl. 67—20.)

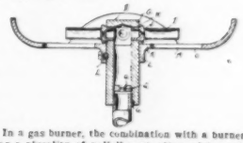
1. A gas igniter comprising a torch, means for supplying gas to said torch, a pipe of hard material at the end of said torch, a support defining a recess in which said torch is adapted to be inserted with said pipe, and a block of a material from which sparks are generated by the friction of said pipe, secured in said support.

1,700,938. GAS STOVE. ALEXANDER KOSMOPULOS, Chicago, and CHRISTIAN EVENSEN, River Grove, Ill. Filed Jan. 11, 1926 Serial No. 80,547. 10 Claims. (Cl. 126—39.)



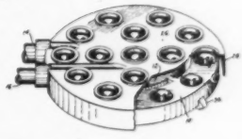
1. A stove comprising a housing, an oven disposed within the housing, a burner beneath the oven, a second burner disposed above the oven, an air intake pipe having connection with said second burner and a passage extending upward to the top of the housing for supplying air to the said air intake pipe.

1,699,032. GAS BURNER. FRANK W SHUELL and ELMER E LEBSETTER, Detroit, Mich., assignors to Everhot Heater Company, Detroit, Mich., a Corporation of Michigan. Filed Mar. 1, 1926. Serial No. 91,596. 5 Claims. (Cl. 158—113.)

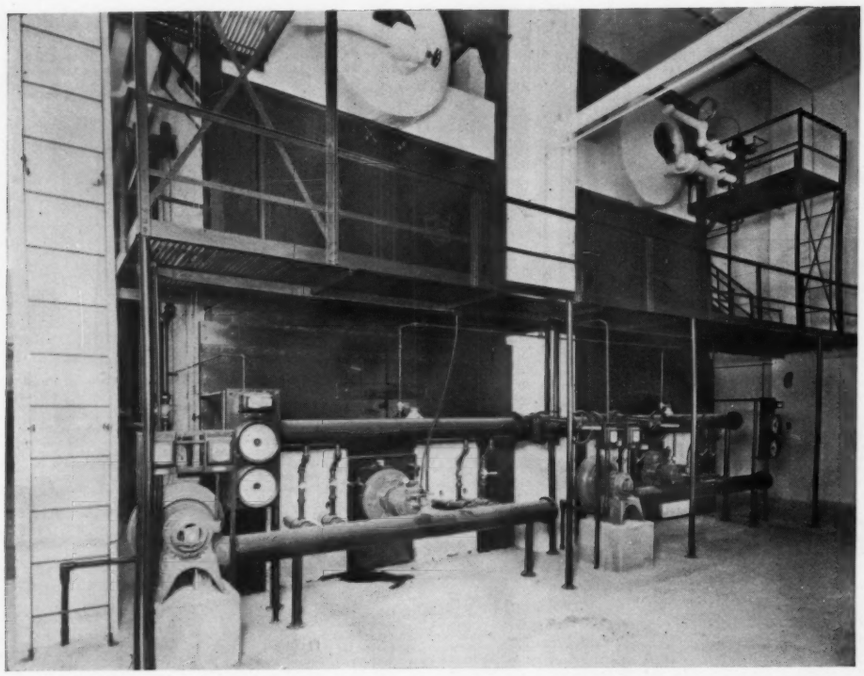


1 In a gas burner, the combination with a burner head having a plurality of radially extending mixing tubes arranged substantially in a common plane, a series of baffles each being spaced from the outlet of one tube and arranged in the path of the issuing mixture, said baffles having curved imperforate surfaces extending outwardly and transversely of said tubes, thereby deflecting the flames from all of said tubes in the same direction substantially perpendicular to said plane.

1,703,684. BURNER. GUILFORD S. MORLEY, University City, Mo., assignor to Majestic Manufacturing Company, St. Louis, Mo., a Corporation of Missouri. Filed Dec. 2, 1927. Serial No. 237,205. 2 Claims. (Cl. 158—104.)



1. A gas burner comprising a plurality of gas chambers, gas inlets communicating with the chambers, air passageways extending through the chambers and formed with restrictions between the opposite ends of the passageways to accelerate the passage of air therethrough, and flame ports located adjacent to the air passageways, the gas chambers being of gradually decreasing cross-sectional areas in a direction away from the gas inlets whereby the pressure of gas at various points within the burner remains substantially uniform.



Gas-fired boiler plant in the Bell Telephone Company Building, Dallas, Texas—an important user of natural gas from Dallas Gas Company's lines. Note the complete operating control equipment which is a part of this modern installation.

Rates *and* Service Unite *to* Sell Industrial Gas

By R. M. REDDING
General Superintendent, Dallas Gas Company

THIS CONCLUDING PORTION of Mr. Redding's paper given before the Kansas City Convention of the American Gas Association's Natural Gas Department, stresses service aspects of the industrial gas sales task. *Western Gas* for June published the earlier sections of the address.—*Editor.*

CHEAP fuel oil and coal in powdered form (25,000,000 tons last year) both offer competition which cannot be ignored. This competition is forcing the gas companies to that which they should have done from the beginning, regardless of the keenness of the competition, namely, providing the service of a trained engineer, qualified to select and install burners and combustion chambers for maximum results, and if necessary, able to carry on and assist the customer to design, install and operate to the desired production of his product, whether this be steam, heat treating of steel, oxidation or reduction, or what not.

We too often assume that our obligations to our own company and to our customers have been discharged when the gas has been properly measured and delivered to the purchaser, entirely overlooking the fact that the latter is not so much interested in the cost per M. as in the unit cost of his product.

Our observations in Texas indicate that we do our best sales work and build up our best defense against oil and coal in the firing room and beyond.

Sale of and assistance in selection of burners, in proper installation and operation, in keeping boiler settings tight, in correcting draft and damper controls to secure the maximum application of heat—and, if necessary, going into the engine room to check the performance of steam engines and other equipment—frequently supply the added weight which holds the load on the line against what we hope are temporarily cheaper prices of other fuels.

Of such importance is this assistance, particularly to such customers as do not have qualified men on their staff, that I consider it entitled to as much consideration on the part of the company as the rate to be offered. The customer is interested only in his unit cost. This means that if the gas company, through its engineering staff, can go into a plant using coal and/or oil and with gas show operating results 5 to 10 per cent better than produced by coal or oil—a rate can be successfully quoted which will be at least 5 per cent higher than could be offered without control service —and this 5 per cent of the monthly bill will be in the net above cost of delivery to the customer.

Industrial gas rates usually are such that the total B.t.u. delivered per dollar is less than the total purchased in coal and oil for the same sum. Hence there arises the necessity of seeing that the customer's plant maintains high efficiency.

The value of such aid to the purchaser can best be judged by the reaction on competition. When the oil companies and coal dealers begin to render similar help to their customers we may then more firmly believe in the soundness of such work on our part. Some weeks ago one of the largest coal dealers in the South had a representative in Texas checking up on methods used by the natural gas companies preparatory to the establishment of a similar department in his own organization, as one of the means of meeting competition of natural gas in his territory.

The gas company's industrial engineer, bearing in mind that he is really a salesman, will work with more assurance if he does not overlook certain basic facts bearing on his control operations. Among these essentials may be mentioned:

(1) Regardless of the type, the purpose of the burner is to mix gas and air in proper proportion for complete combustion, and to assist in the placement of the resulting heat.

(2) The speed of combustion will be in proportion to the partial pressures of the air and the gas, and when either of these is in excess of combining proportions the rate of combustion will be proportional to the partial pressure of the gas. Therefore, excess air has more weight than the percentage indicates, since not only will the excess air lower temperatures and carry off energy as sensible heat, but it also will slow up the rate of combustion, preventing the frequently desired carrying of high overratings on boilers.

(3) Instead of treating a boiler as a unit, it should be treated as consisting of a combustion chamber, and a heat exchanger. The combustion chamber as such may be 98 or 99 per cent efficient, whereas, due to faulty passes, scale in tubes, imperfect damper operation, etc., the boiler as a heat exchanger may be decidedly lacking in transfer of usable energy. After establishing good combustion conditions as a primary step, the boiler should be studied from the standpoint of heat exchange.

(4) When the usual procedure fails in developing the desired results it may be necessary to investigate the stack, bearing in mind that natural gas requires more air per pound than coal and that larger volumes of products of combustion must be removed.

In handling this control, which is really sales work, charts and curves should be

worked out based on the constituents of the gas sold. These may be of any convenient form. A type found very satisfactory in connection with Orsat and stack temperature work is illustrated by the accompanying graph based on pure methane. Such a chart reads directly the percentage of the total gross heat input that is discharged up the stack merely by checking the Orsat and stack temperature reading.

Other desirable curves may be developed for the particular gas in question, such as one based on the volume of the products of combustion with relation to the stack capacity. Knowing the total volume of products of combustion per M.; that the draft is proportional to the height above the grate plane; and that the volume of gas discharged varies directly as the cross section area and the square root of the height, the necessary data are at hand to check the stack with relation to the boiler, and a curve can be developed giving this information without calculating each job.

With the accumulation of experience and operating data, both the sellers and buyers of natural gas are keeping pace with the manufactured gas industry in the refinement of applications and in the use of controls in operation. This is particularly true of the customers using fuel in large quantities. Credit for this improvement in use is shared between the technical salesman of the gas companies and the trained plant operators.

TYPICAL INSTALLATIONS

Illustrating this trend in co-operation between the seller and the buyer I may be permitted to briefly describe one or two recent Texas installations. The first is in a large office building recently erected and one of the finest in the Southwest from an architectural and decorative standpoint. The owners naturally wanted to preserve the beauty of the building both inside and out. Their engineers chose gas as fuel for heat, and co-operated with the gas company representatives in making the power plant a credit to themselves—and a wonderful salesman of natural gas.

This installation consists of two 323 H.P. boilers installed in the sub-basement to supply heat for the building. The gas supply is taken from an intermediate high pressure service into the basement at pressures varying from 15 to 25 pounds.

This pressure is stepped down to six ounces and fed to power type burners supplying air and gas in fixed proportions. Indicating and recording gas pressure gauges, CO_2 recorders, stack pyrometers, draft gauges, steam pressure and horsepower indicators, are all installed at the front of the boilers for the guidance of the operator, and for good measure the more important of these, through distance controls, are duplicated in the office of the chief engineer.

As an emergency reserve, oil burners are so installed that an instant change over can be made.

The result of the planned installation is a boiler room as clean as the lobby upstairs, and after a winter's use, as spotless as the day it was completed.

A different type of installation put in with equal skill consists of three 1900 H.P. high duty boilers designed to operate up to 300 per cent rating.

This setting was designed and installed to burn either gas or oil. It differs from the job just mentioned in that the burners are of the high pressure type taking gas at from 1 to 10 pounds. The installation is made up of a header running along the floor line of the operating room adjacent to the front of the boilers; connections from this header lead to a double bank of the tube type burners which are so constructed as to discharge the gas into the furnace at a 60° angle cone. Acting as injectors these burners entrain the necessary air from a duct on the front of the boiler. Controls on this duct are such that the operator without necessity of any structural change, can use air at atmospheric temperature, or preheated air if available.

The emergency fuel is oil supplied from a header running across the boiler front some distance above the floor line.

Perhaps the most unusual feature of this installation is the ease of change over. The usual time of changing a burner from oil to gas or vice versa is two minutes. Although simple in design and unusually flexible in change over, this plant, using a full set of control instruments, maintains a normal operating efficiency of 78 to 79 per cent.

The successful sales engineer cannot class himself as a "Specialist." Much of his work will be done after the contract is signed. Perhaps I may be allowed to illustrate this point by referring to a few instances taken from the routine work of companies selling the Southwest.

Up to three years ago no cement company in Texas was using gas on its kilns. Constructive sales work, involving a couple of months actual study of rotary kiln operation, resulted in the trial installation of burners on one kiln in a plant using oil.

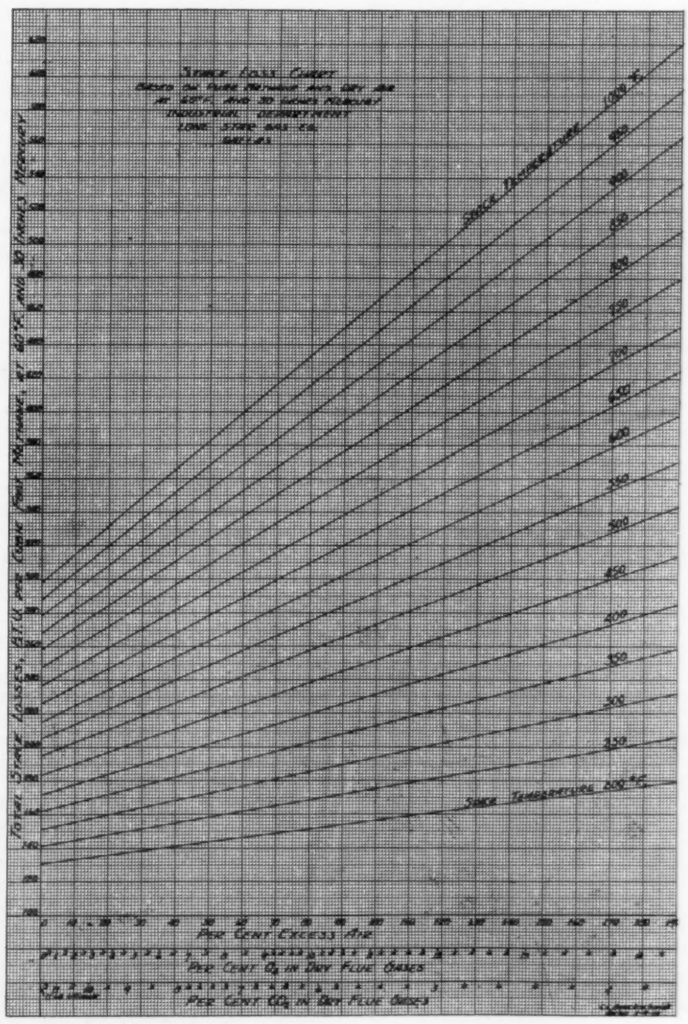
Today cement plants using gas, and plants under construction which will be gas equipped, total a load of 30 millions per day on six plants.

Two or three months ago, a manufacturer of cans found production from his automatic machines held back for want of a certain type of automatic soldering iron. The gas company completed the sale of gas by designing the required soldering attachment, giving just the temperature to avoid damaging the lacquer on the cans.

A West Texas plant making wall board and other gypsum products uses gas in five types of application, worked out with the aid of gas company engineers—a complete gas operated plant from raw material to finished product.

A few days ago an albumin products company needed a dryer in 24 hours; they were satisfactorily supplied by adapting a unit space heater then in the gas company's shop under test.

Some years ago a retired Chicago engineer conceived and developed a method of applying man-made weather to farm operations, particularly to the curing of forage crops. It is in use today, near Waco—gas furnishes the heat in equipment and application worked out by the gas company's engineer. The increase in production per acre—due to almost 100 per cent recovery, more than pays the cost—and rain or shine, it's only 60 minutes from standing alfalfa to ground and packed feed ready for market.



With *the* Metermen

Square Root Chart Application *for* Use *with* Orifice Meters

By J. J. DELANEY
*General Petroleum Corporation**

IT IS apparent to all close observers in the measurement field that with the increased use and demand for the orifice meter as a measuring instrument for volumes of gases and fluids, that an ever increasing number of types of meters with varying pressure combinations are evident, and that usually a different type of chart is needed to properly record the volumes as metered.

Today many companies are confronted with the problem of having to stock and read as many as 20 different kinds of charts for possibly the one make of meter; this is confusing to say the least, for the warehouse man endeavoring to keep his stocks complete at all times has to constantly be informed of new types of charts necessary for odd differential and pressure combinations that will be required for this individual meter or meters, and in time the number of charts carried, having various differential and pressure ranges, becomes enormous.

The chart man and chart reader have also to exercise extreme precautions in seeing that the right chart is placed on each meter and in reading the charts to see that the readings taken therefrom correspond to the actual differential and pressure ranges so indicated by the individual type of chart. Table No. 1 will give an idea of some of the various types of charts manufactured to take care of the various ranges of meters.

Operator or Plant	
Gas Measured	
Meter No.	Spring Size
Atmospheric Pressure Position	
Size of Line & Orifice	
24 Hour Coefficient	

Typical form for recording essential meter data on tag to be attached to meters.

Seven-day charts can also be obtained for all of the above combinations, which, when multiplied, give a total of 46 charts, all having different specific ranges. Each chart must be used with the proper type of meter to insure accurate measurement of the commodity passing.

The square root, or direct reading chart, while available for a long time, has never been used profusely. Quite recently a few people have recognized its potential worth and are exceedingly interested in its application to daily metering problems and the simplicity with which it applies to all orifice meters regardless of their differential or pressure range. This one type of chart does the work of all the other types of charts as spoken of above and it is easy to see that it enables greater efficiencies to be practised in chart distribution and reading.

The square root chart costs less than the ordinary differential-pressure types of charts, in that the square root chart is only handled once in the printing of the black circular lines and numerals, while the ordinary charts require two printings, one for the black figures and lines, the other for differential or red figures.

In using the square root chart the meter instruments are actually called upon to do the work, whereas with other types of charts, every pressure and differential range and combination of ranges has its own different chart to make the meter record properly. In making the square root chart applicable to all orifice meters, it is only necessary to make minute changes, such as the M-10 meter, equipped with the 0 lb.-10 lb. static spring, in which case the static spring has to be changed to an M-40. On the M-25 and M-30 meters the static spring can be used as it is; provided however, that the wire coil surrounding the static spring is removed by clipping close to the pressure tube, removing wire coil, and in so doing converting static pressure spring to an M-40 type. All other types of meters and pressure springs are equipped to carry the square root charts without any further changes.

The static pressure pen used in conjunction with the square root chart may be set to compensate for any absolute pressure. In making the static pen adjustment, however, on 14.73 lbs. absolute, the maximum range of a 100 lb. static spring would be reduced to an 85.27 lb. observed gauge pressure, while the minimum range would be zero absolute; other spring ranges would be affected in a like manner. If the absolute pressure is recorded on a square root chart the rate of flow varies as the square root of the actual pressure indications as well as the square root of the differential indications. With the meter recording the square root factors of both the differential and the absolute pressure, the use of the pressure extension book is eliminated, as the pressure extension changes from

$X = \sqrt{h\,(P + 14.73 \text{ lbs.})}$
X = Extension of pressures
h = Diff. inches of water
P = Gauge pressure
14.73 lbs. = Absolute pressure

to

$X = h_u P_u$
X = Extension of sq. rt. indications
h_u = Sq. Rt. of diff. in inches of water
P_u = Sq. Rt. of absolute pressures

Since line 1 on a direct reading chart is always one per cent of the maximum range of the chart, then the differential corresponding to line 1 is 1/100 of the maximum differential range of the meter. And the absolute pressure corresponding to line 1 is 1/100 of the maximum absolute pressure range of the static spring.

The orifice meter gauges and static springs as manufactured vary as to differential

*Presented before the Southern California Meter Association, April 25, 1929.

So. Cal. Metermen Elect *for* New Fiscal Year

ROUNDING out the second full year of its existence, the Southern California Meter Association met at Long Beach Calif., on June 28 to elect another panel of officers and committee chairmen. Following is the selection of Association executives for the new fiscal year:

J. J. Delaney

President: J. J. Delaney, General Petroleum Corporation of California.

Vice-President: B. G. Williams, Southern California Gas Company.

Secretary: G. S. Duncan, General Petroleum Corporation of California.

Treasurer: W. M. Young, The Texas Company.

COMMITTEE CHAIRMEN

Program: R. L. Cook, Southern California Gas Company.

Publications: L. J. Patrossa, Norwalk-Bankline Company.

Membership: V. E. Schultz, Richfield Oil Company.

By-laws: R. F. Angell, Union Oil Company.

Entertainment: M. R. Miller, Southern Counties Gas Company.

Standards: T. K. M. Smith, Industrial Fuel Supply Company.

Retiring President B. M. Laulhere presided over the annual meeting, which was featured by an hour of entertainment consisting of dance and musical numbers. M. R. Miller, who succeeds himself as entertainment committee chairman was in charge of the program.

Presentation of the "Southern California Meter Association - *Western Gas* - Good Fellowship Trophy"—a perpetual golf trophy given the Association by *Western Gas* for competition at its monthly tournaments—was made at the June meeting.

range and pressure range and when converting from the old type chart to the square root chart it is only natural that correction factors have to be applied to the air coefficient to adjust them to compensate for the single type square root chart so as to make these direct reading charts applicable to all the manufactured ranges of meters. The values of the meter constants vary as to the differential and pressure ranges of the meter and are equal to $\sqrt{hP}$ when h is the differential and P is the absolute pressure represented by line 1 on the direct reading charts.

When correcting an air coefficient for use with square root charts the meter constant is arrived at from the formula,

$.01\sqrt{R_h R_p}$ where

R_h = maximum differential ranges in inches of H_2O

R_p = maximum pressure ranges of the static spring

then C = air coefficient x M as meter constant = U as corrected air coefficient to apply with direct reading charts. Therefore $Q = Uh_u P_u$.

When the absolute pressure is compensated for on the square root charts, the atmospheric position of the pressure pen will be other than zero, depending on the range of static spring employed. The formula for determining this atmospheric pressure pen position is

$10\sqrt{A/R_p}$ where

A = atmospheric pressure lbs. per sq. in. (14.73 lbs.)

R_p = pressure range of spring in lbs.

In converting the square root factor of the static pen reading to atmospheric pressure, so that the field men would be able to tell what gauge pressure existed at any time, various ideas have been tried, such as attaching to the meter a strip section of the ordinary chart which shows actual gauge pressures. Directly beneath and matched to the above old chart strip section, is attached a section of the square root chart. Indications observed on the direct reading chart can then be compared, providing, however, that it be borne in mind that the square root chart is correcting for the absolute pressure and the necessary allowances made for this deviation. This method has not proved at all satisfactory and is very confusing to the field men in trying to convert. The better way is to attach to each meter or meter housing, tables as shown herein, which are exceedingly easy to read and interpret, the absolute pressures being compensated for when making up the tables. Differential indications on the square root charts can also be compared to inches of differential; the indications from a 10-inch differential meter will be 1/10 of those for the 100-inch meter.

PRESSURE READINGS ARE BASED ON AN ATMOSPHERIC PRESSURE OF 14.73 LB.

Reading on Sq. Root Chart	Pressure Range of Spring					Differential Range			Reading on Sq. Root Chart	Pressure Range of Spring					Differential Range		
	24.7 Lb.	50 Lb.	100 Lb.	250 Lb.	500 Lb.	100 Ins.	50 Ins.	20 Ins.		24.7 Lb.	50 Lb.	100 Lb.	250 Lb.	500 Lb.	100 Ins.	50 Ins.	20 Ins.
	Ins. Vac.	Ins. Vac.	Ins. Vac.	Lbs. Press.	Lbs. Press.					Ins. Vac.	Lbs. Press.	Lbs. Press.	Lbs. Press.	Lbs. Press.			
0.0	29.92	29.92	29.92	.....	.....	0.0	0.0	.0	6.7	7.40	7.72	30.16	97.50	209.72	44.9	22.4	9.0
1.0	29.42	28.90	.....	.....	.....	1.0	0.5	.2	6.8	6.72	8.39	31.51	100.87	216.47	46.2	23.1	9.2
1.5	28.79	27.54	.....	.....	.....	2.2	1.1	.4	6.9	6.04	9.08	32.88	104.30	223.32	47.6	23.8	9.5
1.716	28.45	26.93	.....	.....	0 lb.	...	...	...	7.0	5.34	9.77	34.27	107.77	230.27	49.0	24.5	9.8
2.0	27.91	25.86	.....	.....	5.27	4.0	2.0	.8	7.1	4.63	10.48	35.68	111.30	237.32	50.4	25.2	10.1
2.4	27.03	24.07	.....	.....	14.07	5.8	2.9	1.1									
2.427	26.98	23.94	.....	0 lb.	14.72	...	...	...	7.2	3.92	11.19	37.11	114.87	244.47	51.8	25.9	10.4
2.5	26.78	23.57	.....	.90	16.52	6.2	3.1	1.2	7.3	3.19	11.92	38.56	118.50	251.72	53.3	26.6	10.7
3.0	25.41	20.78	.....	7.77	30.27	9.0	4.5	1.8	7.4	2.45	12.65	40.03	122.17	259.07	54.8	27.4	11.0
3.2	24.78	19.52	.....	10.87	36.47	10.2	5.1	2.0	7.5	1.70	13.40	41.52	125.90	266.52	56.2	28.1	11.3
3.4	24.12	18.18	.....	14.17	43.07	11 6	5.8	2.3	7.6	.94	14.15	43.03	129.67	274.07	57.8	28.9	11.6
3.6	23.42	16.76	.....	17.67	50.07	13.0	6.5	2.6	7.7	.18	14.92	44.56	133.50	281.72	59.3	29.6	11.9
3.837	22.54	14.97	0 lb.	22.07	58.87	14.7	7.4	2.9	7 72	0 lb.	15.07	44.67	134.27	283.27	...	...	...
4.0	21.89	13.67	1.27	25.27	65.27	16.0	8.0	3.2	7.8	.30	15.69	46.11	137.37	289.47	60.8	30.4	12.2
4.2	21.07	12.01	2.91	29.37	73.47	17.6	8.8	3.5	7.9	.69	16.48	47.68	141.30	297.32	62.4	31.2	12.5
4.4	20.21	10.26	4.63	33.67	82.07	19.4	9.7	3.9	8 0	1.08	17 27	49.27	145.27	305.27	64.0	32.0	12.8
4.6	19.30	8.43	6.43	38.17	91.07	21.2	10.6	4.2	8.1	1.48	18.08	50.88	149.30	313.32	65.6	32.8	13.1
4.8	18.36	6.52	8.31	42.87	100.47	23.0	11.5	4 6	8.2	1.88	18.89	52.51	153.37	321.47	67.2	33.6	13.4
5.0	17.38	4.53	10.27	47.77	110.27	25.0	12.5	5.0	8.3	2.29	19.72	54.16	157.50	329.72	68.9	34.4	13.8
5.1	16.87	3.51	11.28	50.30	115.32	26.0	13.0	5.2	8.4	2.70	20.55	55.83	161 67	338.07	70.6	35.3	14.1
5.2	16.36	2.46	12.31	52.87	120.47	27.0	13.5	5.4	8.5	3 12	21 40	57.52	165.90	346.52	72.2	36 1	14.4
5.3	15.83	1.39	13.36	55.50	125.72	28.1	14.0	5.6	8.6	3.54	22.25	59.23	170.17	355.07	74.0	37 0	14.8
5.4	15.29	31	14.43	58.17	131.07	29.2	14.6	5.8	8.7	3.97	23.12	60 96	174.50	363.72	75 7	37 8	15 1
5.427	15.15	0 lb.	14.72	58.90	132.52	...	...	...	8.8	4.40	23 99	62.71	178.87	372.47	77 4	38 7	15 5
5.5	14.74	.40	15.52	60.90	136.52	30.2	15.1	6.0	8 9	4.82	24 88	64.48	183.30	381.32	79 2	39 6	15.8
5.6	14.19	95	16 63	63.67	142.07	31.4	15.7	6 3	9 0	5 28	25.77	66.27	187 77	390.27	81 0	40.5	16 2
5.7	13.62	1.52	17 76	66.50	147.72	32.5	16.2	6.5	9.1	5.72	26 68	68.08	192.30	399.32	82.8	41.4	16.6
5.8	13.04	2.09	18.91	69.37	153.47	33.6	16 8	6.7	9 2	6.18	27.59	69.91	196 87	408.47	84.6	42.3	16 9
5.9	12.46	2.68	20.08	72.30	159.32	34.8	17.4	7 0	9.3	6.63	28.52	71 76	201.50	417 72	86.5	43.2	17.3
6.0	11.86	3.27	21.27	75.27	165.27	36.0	18.0	7 2	9.4	7.09	29.45	73.63	206.17	427.07	88.4	44.2	17 7
6.1	11.25	3.88	22.48	78.30	171.32	37.2	18.6	7 4	9 5	7 56	30 40	75.52	210.90	436 52	90.2	45.1	18 0
6.2	10.64	4.49	23.71	81.37	177.47	38.4	19.2	7.7	9.6	8.03	31 35	77.43	215.67	446.07	92.2	46.1	18.4
6.3	10.01	5.12	24.96	84.50	183.72	39.7	19.8	7 9	9.7	8.51	32.32	79 36	220.50	455.72	94.1	47 0	18 8
6.4	9.37	5.75	26.23	87.67	190.07	41.0	20.5	8.2	9 8	8.99	33.29	81.31	225.37	465.47	96.0	48 0	19 2
6.5	8.72	6.40	27.52	90.90	196.52	42.2	21.1	8.4	9.9	9.48	34 28	83.28	230.30	475.32	98.0	49 0	19 6
6.6	8.07	7.05	28.83	94.17	203.07	43.6	21 8	8.7	10.0	9 97	35 27	85 27	235.27	485 27	100.0	50 0	20 0

In order to make the results of the meters more intelligent for all parties interested, it is also a good plan to attach to each meter a small linen or paper tag, (see typical form for tag) on which the essential meter data are found; these data should consist of the size of line and orifice plate; type of pressure spring; differential range of meter; atmospheric pressure position of static spring and the hourly or 24-hour coefficient applicable to that installation. With these data available at all times on each meter, plant operators, field men or other parties concerned can readily compute the flow through the meter as the Coefficient x Pressure indication x Diff. indication = Quantity.

With the tag carrying the proper coefficient for the commodity being measured, such as steam, oil, water, gas, etc., the results obtained will be In pounds of steam, gallons of oil, or water and cu. ft. of gas or vapor. Liquid meters of course, take into consideration only the differential indication in computing volumes.

In cases where orifice plate, static spring, or meter are changed often, it is necessary to have the metermen change the data on the tag to correspond with whatever change takes place. Any change of these elements will cause coefficients to become inaccurate and necessitate new coefficients being figured. A good idea is to have the meterman making these changes mark same on the face of the chart, and to forward to chart computing office the same day a job ticket verifying the change. In this manner the chart computing office can make up the coefficient with as little lost time as possible and at this time a new data tag is also completed and sent to the chart man to attach to the meter and the old tag is destroyed. In this respect the meter is never longer than three days without a data tag having the correct coefficient and the same as carried by the office. If questions arise on volumes before the proper corrected tag is replaced, the person checking the flow will immediately see on looking for the coefficient on the tag that certain changes have been made and that coefficient as carried is not correct. Communication with the chart computing office is then essential for obtaining the correct coefficient; or if persons interested have the proper data, correct coefficients can be computed by themselves.

The computing of the direct reading charts is also greatly simplified. By having the one type of chart on all meters the chart readers are interested in nothing else except the flow indication as recorded by the pen arm. Efficiency, of course, in the computation and reading of same depends on the individual; but it has been our experience that less time is required in reading the square root charts, for reasons that the chart readers do not have to bother with changing differential or pressure ranges as signified on the ordinary charts, where the differential range on the same width chart varies from 10 inches to 100 inches with the various divisions changing their significance; the pressure range varies in the same manner and is very confusing even to experienced chart readers. A discrepancy also arises occasionally where the chart collector gets the wrong colored ink in the pen. This condition would make no difference where the square root chart is employed, as the indications or multiples remain the same; however, this error on an ordinary chart will change the reading considerably, providing that the chart readers take the reading as the different colored lines indicate.

The accuracy of the square root chart as compared to the ordinary differential-pressure chart in actually recording pressures and in figuring volumes from these charts varies only slightly for the majority of cases. However, quite a discrepancy might exist which would tend to favor the direct reading chart, in that on an ordinary chart there are 50 equally divided circular lines and having a low differential reading which would indicate a relatively small flow, the volume would probably be read fairly accurately. On the same chart if the differential read-

(*Continued on Page 48*)

TABLE NO. 1. 24 HOUR CHARTS

Pressure Range		*Differential Range*		
30 in. Vac.—20 lbs.		50 in.	20 in.	10 in.
30 in. Vac.—10 lbs.		50 in.	20 in.	10 in.
0 lbs. — 10 lbs.	100 in.	50 in.	20 in.	10 in.
0 lbs. — 50 lbs.	100 in.	50 in.	20 in.	10 in.
0 lbs. — 100 lbs.	100 in.	50 in.		
0 lbs. — 250 lbs.	100 in.	50 in.		
0 lbs. — 500 lbs.	100 in.	50 in.		
0 lbs. — 1000 lbs.	100 in.	50 in.		
25 in. Water Vac.—25 in. Water Press.				2.5 in.

Western Gas Salesmen's Competition

Prizes: $50.00 in Gold Each Month

Contest Details Published Elsewhere on These Pages

Salesmen from Three States Divide Honors in Furnace Contest

PRIZE money in WESTERN GAS' competition on domestic gas furnace salesmanship goes to three widely scattered points in our western field—first prize, $25, to St. Louis, Missouri—second, $15 to Santa Monica, California—third, $10, to Tacoma, Washington. Winners are named and the contest returns reviewed by Clifford Johnstone, executive secretary of the Pacific Coast Gas Association, who is Contest Judge for these monthly salesmen's competitions, in the letter below.

Following Mr. Johnstone's letter appear the three successful manuscripts.—EDITOR.

June 19, 1929.

Mr. Geo. Finley
WESTERN GAS
124 West 4th Street
Los Angeles, California

My dear Mr. Finley:

I have again completed the difficult task of judging the papers submitted in your salesmen's contest, and have picked the following as being the champion salesmen of gas furnaces:

1*st* Norman B. Terry, Public Relations Department, Laclede Gas Light Company, St. Louis, Missouri.

2*nd* Justin M. Kennedy, Special Representative, Southern Counties Gas Company, Santa Monica, California.

3*rd* H. D. Sherrill, Heating Engineer, Washington Gas & Electric Company, Tacoma, Washington.

As in all previous contests, the picking of winners has been a difficult task, as it is evident that the ambition and interest which leads salesmen to compete in these contests is reflected in their work, and as a rule all papers submitted are expertly written and of very nearly uniform excellence.

We all know that house heating by gas is the last word in care-free luxury and the subject has developed unusual enthusiasm on the part of all contestants.

Mr. Terry wins first prize because of his attractive and unusual presentation in which he covers most of the advantages of gas heating in a way which would be most impressive to a prospect.

Mr. Kennedy wins second prize because of the general excellence of his paper and in spite of the fact that he shows the usual weakness of Southern California boosters and has felt compelled to mention the climate!

Mr. Sherrill wins third prize because he has condensed all the most important arguments for gas heat in a brief compass and has done it in a very attractive way.

A number of other papers have brought out some excellent points. Geo. Finney, formerly Secretary of the Gas Furnace Association of Southern California, stresses the balance between temperature and humidity which can be obtained with gas heat, and the excellent ventilation which it provides. This point was also brought out by J. H. Tolle of the Southern Counties Gas Company at Santa Barbara, in a very excellent paper which unfortunately could not be considered for a prize because of its length. A few contestants are failing to observe the word limit set in all of the *Western Gas* Contests, and it should again be stressed that papers over 300 words cannot in fairness to others be made eligible for prizes. There were two more very excellent papers submitted in this last competition which had to be thrown out for this reason. These were by L. R. Crispin of the Washington Gas and Electric Company at Olympia, and by E. D. Cornelison of the same company at Tacoma. These two were among the best papers submitted and, in fact, Mr. Cornelison was the only contestant to emphasize the silence of a gas installation, which is an important point to mention to a prospect who may be considering an oil burner installation.

Yours very truly,
CLIFFORD JOHNSTONE,
Executive Secretary,
Pacific Coast Gas Association.

NORMAN B. TERRY
Laclede Gas Light Co., St. Louis, Mo.

Mr. Terry's manuscript on "Selling Domestic Gas Furnaces" receives first place in this month's contest. It is published on this page.

Gas Furnace Contest—1st Prize—Won by

NORMAN B. TERRY

Laclede Gas Light Company, St. Louis, Missouri.

SUPPOSE some reliable person came to you and said: "For a certain amount each year I'll assume all responsibility for heating your home. I'll see that you have just the right amount of heat you desire, regardless of the weather. I'll keep an unlimited supply of fuel on hand, insuring you against fuel shortages, transportation tie-ups and strikes. In my contract I'll guarantee that you won't be bothered with soot or smoke. The fuel I use makes no ashes, neither does it require storage space in your basement, so you practically add another liveable room to your home. I'll assume all the furnace tending duties; you simply indicate, on a regulator that's on the wall upstairs, the temperature you want and the time you want it, I'll do the rest. I'll bank your fire at night and lower the temperature to a degree conducive to restful, healthful sleep. Then in the morning before you awake I'll start the fire up again so that you arise in a warm, comfortable home."

Wouldn't that kind of househeating service please you, Mr. Customer? Well, that's exactly the service you'll get when you heat your home with gas. It's just like turning over your legal problems to an experienced, successful attorney with a large and satisfied clientele—only in this case the gas company assumes *all* the responsibility and gives you and every one of its clients the same faultless service.

Gas Furnace Contest—2nd Prize—Won by

JUSTIN M. KENNEDY

Southern Counties Gas Company, Santa Monica, California.

"PERFECT weather, don't you think, Mr. Prospect? We certainly could call this region 'God's Country' if it only remained like this winter and summer. That's impossible—but the next best thing I know to assure cheerful warmth the whole year 'round is a systematically designed gas furnace for your home.

"Naturally, you wouldn't think of turning on any heat right now—but sooner or later,

Rush Entries *for* Oven Heat Control Contest!

"OVEN HEAT CONTROL" is the theme of *Western Gas'* current contest, closing on July 15. Salesmen who have delayed their entries should send them at once, by air mail, to Contest Editor, *Western Gas,* 124 West Fourth St., Los Angeles, Calif.

CONTESTANTS have 300 words—not more—to describe how oven heat control may best be sold to the gas user.

YOUR MANUSCRIPT is eligible until midnight of July 15!

$50 *for* 300 Words *on* Radiant-Type Heaters

OUR sixth successive monthly salesmen's competition, with this announcement, officially gets under way. Contests thus far have centered around gas ranges, water heaters, refrigerators, furnaces, oven heat control—and *now* RADIANT-TYPE HEATERS.

Scores of appliance salesmen among *Western Gas* readers will sharpen their pencils on this subject, for everyone has his own ideas on *"How to Sell Radiant-Type Gas Heaters."*

August 15 is the final day for manuscripts to reach the Contest Editor.

Special attention must be called again to the word limit on these contest manuscripts. They must be kept within 300 words. Some excellent entries have automatically been disqualified on this ground in every contest to date.

Read the complete contest conditions in the box below and forward your entries in ample time—before August 15.

The winning manuscripts will appear in September, when seasonal radiant heater sales activity is beginning, and as usual, $50 will be divided among the three high salesmen in the competition.

there will come a chilly spell and if you have a furnace installed now—you can always have uniform heat at the press of a button.

The acme of home comfort is made possible with an automatically controlled gas furnace, and perfect comfort insures a healthful environment. With an efficient gas furnace, you will eliminate the fluctuations in temperature which cause so many present day ills.

"No more fire building, coal shoveling, or the bother and expense of keeping a supply of fuel on hand when your home is heated the modern way—'looking after the furnace' becomes a thing of the past. Neither will there be any dirt or soot to cloud up the basement or soil the woodwork and the neighbor's good disposition.

"If some day you decide to lease or sell, the presence of a gas furnace will greatly enhance the value of your property. With tenants demanding noiseless automatic refrigeration and modern heating facilities, the wise builders are installing gas refrigerators and gas furnaces.

"The practice of leaning upon one's imagination to supply warmth, becomes no longer necessary with a gas furnace in the home. Pure, warm air, furnished to any one room, any group of rooms, or all over the house—instantly; and the installation can be done easily and quickly at an amazingly low cost.

"Do you really think you can afford to be without this service, Mr. Prospect?"

Gas Furnace Contest—3rd Prize—Won by

H. D. SHERRILL

Washington Gas & Electric Company, Tacoma, Washington.

MR. PROSPECT, this gas furnace will give you comfort beyond your imagination. When you arise in the morning your home will be toasty warm regardless of the weather condition outside. Warm rooms to dress in—a warm bathroom for your morning shave—think what this means to your family and to yourself.

Unevenly heated rooms, overheated rooms, going from warm room to cold room—all these conditions are ideal for catching a cold. The automatic gas furnace eliminates this, continually maintaining a constant even temperature at all times throughout your house. A gas furnace affords the best assurance of your family's health.

This gas furnace means convenience. Wind and set the clock—that is all that you have to do to have clean, healthful, comfortable heat at all times. Your fuel comes by pipeline from the gas holder. There is no ordering of fuel—no worry about supply—no waiting for delivery. No longer will you have to fill your basement with fuel. Instead you will have an extra room for the pool table or for the children to play in.

Remember how you reluctantly get up on a winter morning, hurriedly dress in a chilly room and rush downstairs to a still chillier basement to build a fire? Then while you are at your office there are the innumerable trips that Mrs. Prospect makes to feed a greedy furnace. There is the dirt—the fuss—the muss—the ashes—all unnecessary.

This gas furnace eliminates all these old-fashioned labors. It gives you comfort—health—convenience.

WESTERN GAS SALESMEN'S COMPETITION CONTEST CONDITIONS

Subject: HOW TO SELL RADIANT-TYPE GAS HEATERS

Each Contestant may have 300 words in which to give his ideas on how to sell radiant-type gas heaters.

Who May Compete: Any regular reader of WESTERN GAS who is engaged in selling gas appliances to the public, either through gas utilities or dealers.

Prizes: For the manuscript incorporating the best sales ideas on radiant-type gas heaters, $25.00 in gold. For the second best manuscript, $15.00 in gold. For the third best, $10.00 in gold.

Contestants will be limited to 300 words. No mention of manufacturers' products by trade name may be made, and contestants should refrain from comparing one manufacturer's product directly with another.

Manuscripts must reach publication offices of WESTERN GAS, not later than *August 15, 1929.* Address all communications to *Contest Editor,* WESTERN GAS, 124 West 4th Street, Los Angeles, Calif.

Name, address, company affiliation and position of contestant must appear on each page of manuscript. Double-spaced, typewritten replies, printed on one side of sheet only, are preferred. Manuscripts become property of WESTERN GAS, to be published or withheld as desired, and no responsibility for their return is assumed.

Winning replies will be published in the September issue of WESTERN GAS and prize money paid to winners at that time.

Judging of replies will be conducted by Clifford Johnstone, Executive Secretary of the Pacific Coast Gas Association, assisted by a committee.

***Monthly Contests:* In the August issue of *WESTERN GAS* another Salesmen's Competition, open to readers of *WESTERN GAS* (Prizes, $50.00 in gold) will be announced, the winning replies to be published in the issue of October, 1929.**

Carburization *of* Iron *and* Steel

(Continued from Page 33)

which fill the retort and hinder carburization; (c) wide variation in case depth for a given time from day to day. A gas of this type will operate day in and day out, giving a 1/16-inch case in five hours; then without any change detectable by analysis will not produce the same case in 18 to 20 hours on the same material. The following remedies and statements are made after two years intensive research with this type gas and have been in actual production practice in five plants on a wide variety of types of parts for one year with complete success.

A high and variable moisture content was found to be responsible for the great trouble of variable performance. The solution or the prevention of the deposition of excess soot was found in two peculiar forms of iron oxide purposely formed in the work before carburizing. This no doubt acts as a catalyzer. The finished and complete process amply takes care of any variations that can occur in the gas. A protection process patent has been applied for.

The method as reduced to its simplest terms and used practically today on large scale commercial operations is as follows:

The carburizing gas in amounts of about 30 cubic feet per hour for a 600-pound rotary retort furnace is raised in pressure to 15 pounds per square inch. It is then passed through one inch lump commercial calcium chloride contained in two pipes with flange fittings held in a vertical position. The gas passes in the bottom of the first pipe through the calcium chloride and out of the top whence it is led to the bottom of the second pipe and again passes up through the calcium chloride of the second tube and thence out the top and into the back of the retort on the furnace. Somewhere near where the gas inlet enters the retort is placed an ordinary lubricator cup with sight feet. Inasmuch as the gas is at 15 pounds pressure, it is necessary to use a zero pressure type of lubricator. This lubricator should be filled with ordinary tap water.

It is obvious that the calcium chloride towers are for the purpose of drying the gas. These pipes are about 8 inches inside diameter and 8 feet long each. Drain cocks should be put in the bottom of each, and every morning the accumulated free moisture should be drained off. In this way the calcium chloride will have to be removed and dried on an average of once a month. Of course this depends upon the amount of moisture contained in the gas and the condition of mains.

The lubricator filled with water is for the purpose of forming the aforementioned iron oxide catalyst.

To use the apparatus first described, it is necessary with parts made of ordinary S.A.E. 1020 carburizing steel to first charge the furnace and bring this charge to the carburizing temperature 1600 to 1700°F. The vent in the front door is then slightly opened to allow a free flow of the carburizing gas over the work. The dry carburizing gas is turned on at the rate of about 30 cubic feet per hour at 15 pounds pressure and coincidentally with the turning on of this gas the needle valve of the lubricator should be opened to admit into the gas stream 10 drops of water per minute for three minutes only. After this has been accomplished the lubricator must be shut off and the carburization allowed to continue with the dry gas.

In the matter of results, if the foregoing is strictly adhered to, one can confidently expect, on pieces weighing about one pound and having a maximum cross section of ¾ inch, a case of .043 inches in two hours at 1700°F. and using 30 feet of gas per hour. This case will be about 1 to 1.10 per cent carbon in the outer edges and gradually taper down in carbon content to that of the core with the usual entectoid area.

FORMING IRON OXIDE CATALYST

The water in the lubricator cup is for the purpose of supplying oxygen during the first of the run to form an iron oxide on the parts. This oxide is very minute in quantity and is only discernible as small masses of minute crystals of the isometric system by the use of the microscope. They are neither Fe_2O_3 or Fe_3O_4. We do not know their chemical composition, but they do have a very powerful influence upon the gas in preventing soot and have no deterring action on the carburization of the material. Beyond this we know nothing more about them. The removal of the moisture from the gas is necessary to prevent an upsetting of the equilibrium between the gas and steel within the retort when the steel absorbs enough carbon to present a surface of about entectoid concentration. This corresponds roughly to 1/32 inch. If any appreciable amount of moisture is present in the gas, a reversible reaction will occur at about 1/32 inch case depth and the steel will begin to give up a part of its carbon to the gas until it depletes its concentration to below the entectoid when the reaction of the absorption of carbon from the gas by the steel again takes place.

With a wet gas this may go on for hours with nothing to show at the end but a thin useless case. When the gas is dry, however, the reaction proceeds without reverse and the case depth is proportional to the time.

The matter of carbon concentration, however, is somewhat controllable by the composition of the gas and the analysis of the steel.

All steels do not carburize the same, particularly as regards the carbon concentration in the case. As an example a standard low carbon, nickel molybdenum steel was placed in a retort with a low carbon 1 per cent chrome steel. They were carburized to 1/16-inch case depth by the method mentioned above. Upon examination both showed a full 1/16-inch case. The nickel molybdenum piece showed a case of about .90 carbon in the outer zones, whereas the chrome steel showed a highly hyperentectoid zone nearly one-half the case depth thick. This zone would analyze fully 1.40 carbon. Inasmuch as a case containing not more than .90 carbon was desired in both cases, the gas only was manipulated to secure the desired results in the chrome steel by departing from the standard practice to the extent of allowing the lubricator to drip water at the rate of 10 drops per minute throughout the entire run. Thus it is seen that the carbon concentration in a case is not dependent on case depth; likewise different steels react differently to the same gas. For further details of this process the reader is referred to "Gas Carburization of Steel," by Guthrie and Wozasek, Transactions A.S.T.B. December, 1927.

Certain of the so-called abnormal irons and steels are sometimes very reluctant to accept a case of more than entectoid composition. This has been corrected by minute additions of sulphur dioxide to the carburizing gas at the beginning of the run. A steel treated in this way will after a normal carburization exhibit a normal depth case with a highly hyperentectoid zone in the outer edges of the case.

It was mentioned at the beginning of this article that it was only within recent years that steel treating processes had shown much advance. However, within these few years these processes, furnaces, laboratory equipment, such as microscopes, pyrometers, hardness testers, etc., have shown tremendous advances.

Industry as a whole has right-about-faced and is spending millions annually for research along these lines.

NORTHWESTERN UTILITIES CO. PLANS CANADIAN DEVELOPMENT

Involving an investment of $530,000, a construction program has just been announced by Julian Garett, manager of the Northwestern Utilities Company of Edmonton, Canada. This program involves the doubling of the main gas line to Edmonton city for a distance of 20 miles in the area between Viking and Holden. Drilling of three new gas wells, and the completion of a fourth are other items in the construction schedule of this natural gas company.

It is planned to rush the construction work ahead so that it may all be completed by the end of the summer. The estimated cost of laying the new line is $316,000. The three new wells are expected to cost $81,000; equipment and development in connection with the production system will cost approximately $42,000, and this year's extensions to the city distribution system are expected to cost approximately $85,000.

The company is laying a loop pressure line, thus adding over 20 miles of 12¾-inch O. D. pipe lines to its system, beginning at Viking. The loop line will have an interior diameter of 12½ inches, and sufficient strength to withstand a pressure of 350 pounds per square inch. It is the company's intention that the loop will be continued towards Edmonton, and that eventually this line will be capable of handling a daily capacity of 54,082,000 cubic feet per day.

SO. COUNTIES GAS CO. MEN GUESTS AT GOLF MATCH

W. M. Thompson, president of the Reliance Manufacturing Company of Alhambra, California, entertained 20 members of the staff of the Southern Counties Gas Company at the Flintridge Country Club on June 23. Golf was enjoyed during the day, with a buffet luncheon at noon.

1929 Calendar

Southern California Meter Association—Long Beach, Calif., July 26, 1929.

Pacific Coast Gas Association, Annual Convention—Del Monte, Calif., September 10-13, 1929.

International Petroleum Exposition and Congress—Tulsa, Oklahoma, October 5-12.

American Gas Association—Atlantic City, October 14-19, 1929.

Utilities Association Secretaries of the United States—Chicago, December, 1929.

Lowering pipe at two points on the Monroe-to-St. Louis line. Left: Working south out of Pine Bluff, Arkansas. Right: On the northern unit of the large gas carrier.

Rapid Progress Recorded *on* St. Louis Gas Carrier

By Craig Espy
Mid Continent Manager, Western Gas

A SMALL army of men, approximately 2,000 in all, since about the 15th of April have been clearing right of way, digging trenches, stringing and laying pipe and performing the innumerable other tasks necessary to the laying of the 22-inch line which will supply gas about November 1 from the fields of Louisiana to St. Louis and environs for industrial purposes

Half of these men are working on the unit of the line lying between the north bank of the White River at Newport, Arkansas, and St. Louis. The remainder are working between the gas fields of Monroe, Louisiana, and the north bank of the White River at Newport.

Williams Brothers, Inc., of Tulsa, Oklahoma, are constructing the line between Monroe and the above located point, and the Oklahoma Contracting Company of Dallas has the unit extending on into St. Louis. These companies are sub-contractors under Ford, Bacon & Davis, who have the general contract.

The line itself, which is approximately 460 miles in length, is being constructed for the Mississippi River Fuel Corporation, in which the Standard Oil Company of New Jersey, The United Gas Company of Houston, The Electric Bond & Share Company and the United Carbon Company are principals.

One gang of 250 men is working south from St. Louis. Two other gangs of about the same number of men each, are working out of Poplar Bluff, where the Oklahoma Contracting Company is making its headquarters. One gang is going north and the other south toward Newport. For Williams Bros., one crew is working south out of Pine Bluff. One crew is at Perryville, Louisiana, working north; a third crew is working north of Arkansas River near Altheimer, Arkansas, and another is working south out of Newport. Approximately 125 men make up each of the crews. There are two river crossing gangs in addition to the four crews.

The first task after the establishment of camps was the clearing of right of way. The right of way is 30 feet wide, and from this pathway, the entire length of the line, it was necessary to cut the trees, blow the stumps, clear and level the ground preparatory to the actual ditching by the machines.

In shipping the pipe and couplings from the mills the cars were spotted along the way as close as possible to their point of usage. Pipe was transported by truck to the right of way.

The ditching machines, of which there are two to each gang, excavate along the line until their way is beset by rocks and stumps. At this point the ditchers skip to a location on the line more pregnable.

In these skipped places the dynamite shooters—"powder monkies"—find their task laid out for them. These "powder monkies," three to each gang, are preceded in their activities by the drilling crew, who drill holes in and underneath the rock and stump sufficiently large to hold the charge of dynamite. Air compressed hammers are used to drill the holes. There are three compressors in use on the north unit, one to each of the three gangs and two air hammers are operated from each compressor.

A gang of 100 or more men finish digging the ditch and clearing out the rocks after the charges of dynamite have had their effect.

Williams Brothers are constructing all river crossings on the line, and are right now beginning the crossing of the Mississippi at St. Louis. Another river crossing gang is engaged in laying the line across the Bertholomew Bayou in Louisiana.

The chief rivers on the line are the Arkansas, Black, White, St. Francis, Mississippi and Merimac. In each case the line will be laid on the bottom of the river. On the small rivers the pipe is made up in sections, clamps attached, and is pulled from one bank to the other.

On the Mississippi River crossing a tug boat, barge, and pontoon will be employed. The tug boat takes the barge carrying pipe to position, and holds it there. The pipe is connected on the barge and lowered to the pontoon at the rear of the barge, each line is completed across the river—resting on pontoon boats, before it is lowered. Manifold crossings of 8 or 10 lines will be used across the larger rivers, and of four to six lines across the smaller rivers.

ARKANSAS GAS & FUEL CO. APPOINTMENTS MADE

D. H. Thurston, new business supervisor of the Kansas City Gas Company, C. R. Clair, new business representative of the Capital Gas & Electric Company at Topeka, Kansas, and J. W. Black new business representative of the Arkansas Valley Gas Company, of Arkansas City, Kansas, have been transferred to the New Business Department of the Arkansas Gas & Fuel Company of Little Rock, a recently purchased property of the Arkansas Natural Gas Corporation.

S. A. Lipscombe, new business manager of the property formerly held a similar position with the City Light & Traction Company of Sedalia, Missouri, another Doherty holding.

PASO ROBLES TO HAVE GAS FROM SAN LUIS OBISPO LINE

Service of natural gas in Paso Robles, Santa Margarita, Atascadero and Templeton will begin September 1. The gas is being supplied through a line from San Luis Obispo. Santa Maria Gas Company holds the franchise and is laying the line.

L. A. G. AND E. HAS 40 PER CENT GAIN IN NET EARNINGS

Net earnings of the Los Angeles Gas and Electric Corporation for the year ending May 31, amounted to $5,957,003.80, an increase of $1,717,031.33, or 40 per cent, over the previous fiscal period.

NATIONAL ADVERTISING PROGRAM IS BEING PLANNED

The Industrial Gas Section of the American Gas Association, of which John F. Weedon of the Peoples Gas Light and Coke Company of Chicago, Illinois, is chairman, is formulating a plan for a national outdoor advertising program. The plan is for each of the gas companies located along the right-of-way of the most traveled railroads, to use a portion of its advertising budget for the erection and maintenance of billboards. Each bill-board would carry the same subject matter with the name of the local gas company prominently placed, the bulletin to be changed every six months.

Our Changing Public Relations

(Continued from Page 21)

concerted functioning of the entire organization should function as nearly as possible with the same precision, fitness and effectiveness as the mechanical processes of service. It is of the utmost importance that the person should fit the job and that the job should fit into the whole functional system so that service requirements may be met with competence and directness.

All employees, irrespective of the nature of their employment, are vital factors in promoting good public relations. Every one is a factor in his personal contact with the public. Consequently every effort should be exerted to inform him with reference to the practices and policies of the company, the essential facts about the industry with regard to its economic status and its relations with the body politic. The employee will then possess the ability to impart facts to those with whom he comes in contact and to meet the arguments of those who attack the company and the industry because of prejudice or ignorance of the facts. It is a matter of educating the employee, which can be done in a systematic course of instruction through lectures and the discussions engendered by them, and through distribution of well selected reading material. There is an abundance of facts about each company with reference to the nature and extent of its service, the practices and policies effective in rendering the service, the part it has in contributing to the comforts and needs of life in the home and in industry, its growth and development, requirements in meeting the demands for service, relations with public authorities, the functions of the various departments in the administration of its affairs and other subjects which come to mind when such a course of instruction is once under way. Much is said and written about the industry that gets no farther than the executives and heads of departments and oftentimes not even to the heads of departments. Much of it ought to get to the rank and file in an understandable presentation, and the only way it can get to them is to have an organized method to take it to them. There are great potential possibilities for education which require only proper organization procedure to be realized upon.

The management must be constantly alert to see that the personnel is effectively used in creating a satisfactory civic impression. The organization must be made as civically minded as possible. A careful survey should be continuously made so as to find out who are best fitted to participate in civic undertakings and to be active in the affairs of clubs, associations and organized civic activities. Representation in the various organizations should not be maintained merely for perfunctory reasons. Representatives should be those who can help produce results for the organization, thereby reflecting credit upon the individual and his company, and those who can effectively speak for the company in public meetings and in making individual contacts. The intelligent allocation of memberships in civic organizations is a potential asset in cultivating good will which cannnot be wisely ignored by passive affiliations.

The creation of a personal interest on the part of the customer through the ownership of securities constitutes one of the most effective and sustaining means for building satisfactory public relations. The benefits accruing to the utility because of customer ownership of its securities are most significant in their influence upon public relations. In fact, customer ownership because of the almost universal use of the service can become a form of public ownership with a preservation of individual initiative and enterprise, definite responsibility for operating efficiency and economy, sufficient incentive for developing the volume of use, and natural control by proper economic restrictions upon physical expansion. The prospective investor naturally seeks to become informed of the facts about the business in which investment is contemplated. An investment of his capital in securities establishes a material interest in the business. This material interest naturally creates a desire to know the facts about the operations of the business. It gives reason for concern about its problems and progress. The important consideration is that this material interest creates a mind receptive to and solicitous of information. The principal difficulty in getting an understanding of the facts about public utility service is to obtain a proper hearing. A thoughtful hearing is attained when a person puts his money into a business. The facts about our industry when understood are of a nature to command a constructive attitude.

The esteem in which a public utility is held by its community is not determined by what it has to say about itself, but rather by how it conducts itself.

It is well that much less is nowadays stressed about publicity or education of the public through the written and spoken word. Not that publicity is not essential. Education through intelligently directed and truthful publicity is essential. The preparation and dissemination of public information can be wisely made a specialized effort, and a centralized function. However, it is better that more stress be placed upon developing through the personnel an esprit de corps which through service and knowledge will inspire confidence. Confidence finds fruition from the seed of sentiment. That seed can best be sown by the personal contacts of the employee through courteous and efficient service and the enthusiastic and intelligent impartation of facts. What is impressed upon the mind through the indirect methods of publicity can be easily and conveniently forgotten. What is rooted in the sentiment of the individual is of a more enduring nature.

Our public relations are not primarily a matter of expert direction or specialized supervision. They are a matter of departmental responsibility. The departmental official and bureau or division heads functioning under his supervision are not fully qualified for their respective duties if they are not first fully cognizant of the importance of their personnel in the development of satisfactory public relations, and, second, capable of educating and inspiring their personnel to the cultivation of public good will.

It is entirely obvious that the main concern of the user of service is to obtain its use with the greatest possible efficiency and at the least possible cost. This can be attained through efficient and economical operation and an aggressive sales policy. The building up of the volume of business and the effecting of economies in operation are the contributory factors to a decreasing cost of service to the user. A constantly decreasing cost tends to still further increase use of the service. The utility which can provide a courteous and efficient service with a mutual participation between it and its users in the economies of operation and added revenues is sure to establish and maintain satisfactory public relations. There is reward to the user, on the one hand, for increased use, and reward to the utility, on the other hand, for efficient and aggressive management. These results can be more readily and assuredly attained if the management has a properly selected and properly assigned personnel, and the enthusiastic and interested cooperation of it. Furthermore, it will be better fortified financially to meet the requirements for capital wherewith to provide adequate facilities for extensions and improvements of its service. If the utility has the good will of its personnel and its customers and the material interest of as many of its customers as it is possible to interest in its securities, it can more readily and advantageously acquire the capital needed to provide adequate service and thereby contribute to the industrial development and commercial expansion of its community.

Our public relations can rest upon no more secure a foundation than the intelligence and good will of our personnel, the vision, efficiency and aggressiveness of our management, and the material interest of our customers.

NATURAL GAS ENTERS EL PASO ON JUNE 18

Natural gas was turned into the mains of the city of El Paso, Texas, on June 18, with the lighting of the natural gas beacon at 7:45 P.M. by Mayor R. E. Thomason. For the conversion, the city was divided into 11 sectors which received the gas in numerical order. To each consumer was sent a notice with instructions as to the adjustment of appliances previous to the ceremonial.

The supply comes through a 200-mile line from the Lea County fields in New Mexico and is being distributed in El Paso by the El Paso Natural Gas Company.

NATURAL GAS DEPT. OF A.G.A. WANTS ACCIDENT STATISTICS

The Natural Gas Department of the American Gas Association has requested the Accident Prevention Committee to prepare a brochure dealing with accident prevention in construction, maintenance, and repair of high-pressure gas mains. A. R. Gray of the Peoples Natural Gas Company, of Pittsburgh, Pa., a member of the committee, has prepared a questionnaire to be sent to executives of all natural gas companies and members of the Natural Gas Department of the American Gas Association.

PAUL CLAY IS NAMED MANAGER OF CITIES SERVICE UNIT

Paul Clay has been named manager for the Texarkana division of the Cities Service Company. Mr. Clay has for six years been district manager for the Arkansas Natural Gas Corporation at Pine Bluff, Arkansas, and will be succeeded in that post by F. D. Shanks of El Dorado. The new appointments became effective on July 1.

ARKANSAS NATURAL PLANS NEW LINES FROM CLARKSVILLE

In an interview, granted the middle of June, C. O. Moore, president of the interests holding gas franchises in Fayetteville, Rogers, Siloam Springs, Bentonville and other northwest Arkansas towns, stated that negotiations had been completed with the Arkansas Natural Gas Corporation whereby gas for these towns would be piped from the Clarksville fields, instead of the gas fields near Fort Smith, Arkansas.

This field, which is the source for the Clarksville-Little Rock line of the Arkansas Natural, has a total open flow capacity of 190,000,000 cubic feet it was stated, with only 2,500,000 cubic feet being utilized at present. It is believed that the rock pressure in this field is such that it will not be necessary to construct compressor stations on the line to northwest Arkansas. Had the line been constructed, as originally planned from the fields near Alma, a few miles from Fort Smith, one compressor station would have been necessary, Mr. Moore stated.

The line as far as Fayetteville will be 10-inch; from this city north, it will be 8-inch. A city distribution plant has already been completed in Rogers and plants are underway in a number of the other northwest Arkansas cities. Gas will be supplied the cities by early fall.

SO. CALIF. GAS CO. ASKS PERMIT TO SERVE IN SAN DIEGO COUNTY

Application for a franchise covering the transportation and sale of natural gas in San Diego county has been made to the board of supervisors of that county by the Southern California Gas Company, A. B. Macbeth, president of the company, made known in June. Application has also been made to the California Railroad Commission for a certificate of public convenience and necessity to operate under such a franchise.

The company now is negotiating with the San Diego Consolidated Gas and Electric Company to supply gas at the city limits of La Jolla for distribution in that town and San Diego, according to Mr. Macbeth.

A pipeline from Huntington Beach to La Jolla is contemplated, and it is probable that natural gas will be supplied to various communities along the line.

SALT LAKE NATURAL GAS LINE CONSTRUCTION PROGRESSING

Construction work on the Wyoming-Salt Lake line is progressing rapidly. All of the 16-and 14-inch pipe is strung, and about half of the 18-inch.

As a part of the construction program in connection with this line, the Utah Gas and Coke Company is making headway on the installing of the distribution system in Salt Lake City. High pressure mains for industrial service and low pressure for domestic distribution are being laid, together with 21 regulators located in different places on the 18 miles of high pressure lines. This work is expected to be completed in 30 days.

P. G. AND E. ENGINEERS VISIT KETTLEMAN HILLS DISTRICT

H. J. Smith, Fred Doyle and O. A. Philpot, all engineers in the Pacific Gas and Electric Company's gas construction department, have visited the scene of the new compressor station at Kettleman Hills recently and report that the warehouses are up, 10 cottages are under construction and the concrete is about to be poured for the foundations of the station.

Duplex Regulator Setting Favored *by* Lone Star

By T. O. BANTA

Chief Positive Meter and Regulator Inspector, Lone Star Gas Company

IN measuring stations that are built with only one high pressure regulator on inlet of meter, measuring gas from 10 to 20 pounds, trouble can be expected due to regulator freezing. Main line pressure usually runs from 200 to 50 pounds, and unless a heater is installed one regulator will not prove satisfactory, due to freezing and also varying outlet pressure.

The setting shown above eliminates freezing, as two regulators are used. The first regulator cuts the pressure to 90 pounds and the second to 10 or 20 pounds. In the first regulator we use 5/16-inch valves and 11/16-inch in the second, as this is on a small town plant.

Two 2-inch nipples with flanges replace the original regulator. A flange in center of 2-inch nipples is used to put in blank plate. A 1-inch collar is welded to the 2-inch nipple on the high side of the blank plate; the 1-inch regulator, made up from 1-inch collar, discharges into a 10-inch header. The header serves as a cushion to prevent regulators from pumping. Gas from the cushion passes through a 1¼-inch regulator which discharges into a 2-inch nipple on the low side of the blank plate.

This setting can be installed at a very low cost compared to remodeling the whole installation to put in another regulator. Regulators can be changed in a very few minutes, when trouble necessitates removal of one or both, by simply breaking unions and unscrewing regulators from welded nipples.

Since the first setting of this kind has given such splendid results we are now building several more to install and will convert all measuring stations from one high pressure regulator to two high pressure regulators during the summer in order to have all stations changed over for the coming winter.

NORTHERN LOUISIANA COMPANIES IN EXTENSIVE MERGER

Plans have practically been consummated, according to report, for bringing into one organization, namely the Louisiana Gas & Fuel Company, of gas properties in northern Louisiana owned by the Industrial Gas Company, the Palmer Corporation of Louisiana, Natural Gas Producing Company of Louisiana, Ouachita Natural Gas Company, Morehouse Natural Gas Company, Northern Louisiana Gas Company, Southern Gas and Fuel Company, Panola Oil & Gas Company, Excelsior Pipe Line Company, U. S. Carbon Company.

The newly merged company has established offices in Shreveport, with N. C. McGowen, vice-president of the Palmer Corporation, as president and H. C. Couch of the Arkansas Power & Light, Mississippi Power & Light and Louisiana Power & Light companies, as chairman of the board. W. J. Parks and R. H. Hargrove are vice-presidents of the new company.

Gas will be supplied by the company to the line now being constructed by the Mississippi River Fuel Corporation into St. Louis as well as to the line underway to Birmingham and Atlanta. It will also be the source of gas for the Interstate Pipeline Company's line now serving Baton Rouge and New Orleans.

PUBLIC SERVICE CO. OF KANSAS ASKS PERMIT TO OPERATE

A certificate of convenience and authority to operate as a public utility, in Clark, Comanche, Kiowa and Pratt Counties, Kansas, was asked May 28 by the Public Service Company of Kansas, a Delaware Corporation, before the public service commission.

In its proposal the company announced its intention of serving Ashland, Protection, Coldwater, Greensburg, Haviland, Wellsford, Cullison and Pratt, all in Kansas. The Watchorn gas field in Clark County will be the source of gas supply, it was stated. A high pressure line will extend from the well to Pratt, with lateral lines being constructed to serve the other towns. The company's Kansas headquarters are at Pratt. It is understood that several towns have already granted franchises, and that actual construction is under way.

BULLETIN NO. 233 ISSUED BY CONNERSVILLE BLOWER CO.

Bulletin No. 233, just issued by the Connersville Blower Company of Connersville, Indiana, supersedes a previous edition, numbered 33, in describing Victor Gas Boosters, suitable for gas burning furnaces or oven installations, also booster service on distribution lines and in processes where clean gas is handled.

In addition to the features of design the bulletin includes tables which designate the capacities of the different sizes and types of boosters. Machines arranged for either belt drive or direct motor drive are illustrated.

GAS COMPANY EMPLOYEE WINS SPEAKING CONTEST

Lily H. Paull of the Spokane Gas and Fuel Company of Spokane, Washington, who won second place in *Western Gas'* April Salesman's Contest, and third place in the Water Heater competition in May, took first honors in the three-minute speaking contest of the Pacific Advertising Clubs' Association held in Oakland, California, recently.

Natural Gas By-Products

(*Continued from Page 30*)

the hydrogen obtained will cost, including the expense of its simplification, from 6c to 7c per 1,000 cu. ft. and we have in the process separated the required volume of nitrogen from the oxygen of the air. F. A. Ernst, in a paper on Ammonia Production and Conversions Costs, read before the American Institute of Chemical Engineers, figuring electricity as costing $30.00 per KW year, estimates electrolytic hydrogen as costing $1.00 per 1,000 cu. ft. A plant yielding 825,000 cu. ft. of hydrogen per day is estimated to cost $428,444.00. The $1.00 estimate includes 20 per cent per annum for amortization of the plant. At the end of five years, the cost of the hydrogen will be reduced by reduction in capital overhead to around 75c per 1,000 cu. ft. In a small plant decomposing water by electrolysis, the sale of the oxygen produced at the same time may reduce somewhat the cost of the hydrogen, but few situations exist where 400,000 cu. ft. of oxygen could be sold daily.

Natural gas containing CO_2 or nitrogen may be used, though its value generally will be measured by its B.t.u. per cubic foot. The CO_2 absorbed from the gas need not be wasted. There are no doubt situations where a profitable market could be found for a large volume compressed in cylinders for use in the carbonation of soft drinks. It can be used with a part of the ammonia to produce ammonia carbonate according to the equation,

$$2NH_3 + H_2O + CO_2 = (NH_4)_2\,CO_3.$$

This is quoted at 8½c per pound. Or the process can be carried further with the production of ammonia bicarbonate or urea. German I. G., without local supplies of sulphur for the production of sulphuric acid, uses the CO_2 absorbed from water gas to obtain the hydrogen with water and gypsum, to produce ammonia sulphate, according to the equation,

$$2NH_3 + CO_2 + H_2O + CaSO_4\ (\text{gypsum}) = (NH_4)_2\,SO_4\ (\text{ammonia sulphate}) + CaCO_3\ (\text{carbonate of lime}).$$

The production of carbon black by thermal decomposition may be profitably combined with the production of organic nitrogen or the production of the latter product from natural gas may be carried on as an independent enterprise.

METHANOL

Following rather closely the development of the Haber process of nitrogen fixation, another German chemist discovered that by the use of a somewhat different catalyst, at somewhat lower temperatures, and pressures, carbon monoxide and hydrogen in the volumetric proportions of one and two could be made to unite according to the equation

$$CO + 2H_2 = CH_3OH$$

yielding methyl alcohol or methanol, more generally known as wood alcohol because prior to the development of this process, it was obtained commercially only as one of the products from the distillation of wood.

This also can be produced using natural gas as the raw material. Nitrogen must be excluded from the mixture, so air cannot be used in the simplification process as the oxidizing agent or a natural gas employed which as it issues from the ground contains a substantial per cent of nitrogen. There is in gases of the C_nH_2N plus 2 series, a deficiency of carbon relative to hydrogen. No carbon can be spared for the production of carbon black, but it must be added in the form of CO_2. Again using both high temperatures and catalytic effects to accomplish the simplification, the reactions which result (assuming for simplicity the use of a pure methane) may be represented by the equations:

$$CH_4 + CO_2\ (\text{Carbon dioxide}) = 2CO + 2H_2$$
$$2\,CH_4 + 2H_2O\ (\text{Steam}) = 2CO + 6H_2$$
$$4CO + 8H_2$$

The CO_2 needed will be found present in some natural gas as it issues from the ground in a proportion close to adequate for the requirements of the process, but where not present can readily be obtained by absorbing out CO_2 with water under pressure from the combustion gases given off from the natural gas burned to produce power or heat.

I am not fully informed as to the patent situation with respect to the synthetic procedure. Lazote, Inc., a subsidiary of du-Pont Company, is producing methanol by the synthesis of gases derived from water gas at Belle, West Virginia. Commercial Solvents Corporation is obtaining it with a high degree of success from CO_2 and hydrogen given off by the fermentation of corn in the process by which Butyl alcohol and acetone are produced at Peoria, Illinois, (Ind. & Eng. Chem., October, '28).

30 cu. ft. of methane with the requisite proportions of CO_2 and steam will produce:

20 cu. ft. CO plus 20 cu. ft. H_2
20 cu. ft. CO plus 60 cu. ft. H_2

40 cu. ft. CO plus 80 cu. ft. H_2
40 cu. ft. CO weighs 2.974 lbs.
80 cu. ft. H_2 weighs .425 lbs.

3.399 lbs.

A gallon of methanol weighs almost exactly 6.5 pounds. Ignoring losses likely to occur by reason of incomplete simplification, leakage, incomplete conversion, and loss by purging, 30 cu. ft. of methane with the addition of some CO_2 and steam, will supply the raw material for a half gallon of methanol. On the N. Y. Chemical Market 95 per cent methanol is quoted today at 55c to 60c per gallon. This, like ammonia, may be produced wherever natural gas, water, and air are available. There is a greater possibility of over-production with respect to methanol than in the case of nitrogen. Somewhere in the neighborhood of 6,000,000 gallons met the needs of this country during 1928. But there is protection from a price level which would fail to be remunerative, in the fact that if the price by reason of increased supply fall below the price of denatured ethyl alcohol, methanol can be substituted in place of denatured ethyl alcohol in a large field of use, as a solvent in the preparation of paints and varnishes, as an anti-freeze mixture, etc.

Denatured grain alcohol is now 43-45c per gallon (N. Y.) in carload quantity. It has, over a long period of years, had the advantage of being produced and sold at a less cost than methyl alcohol produced by the distillation of wood. It is likely to rise in cost by reason of Federal restrictions upon the volume made and an increase in the cost of black strap molasses, which is the cheapest raw material from which it can be made. In no event can it be produced as cheaply as methyl alcohol from simplified natural gas. If molasses be 9c per gallon, the cost of the molasses from which one gallon of 95 per cent industrial alcohol is obtained, will be 23c. Using potatoes at 25c per bushel, the cost of the raw material for one gallon of 95 per cent alcohol is 32c.

Assuming that 40 per cent of the natural gas consumed in the production of methanol is burned for power or heat, 1,000 cu. ft. will yield around 9 gallons of methanol. If the cost of the natural gas be 16c per 1,000 cu. ft., the cost of the raw material per gallon is less than 2c.

The possibility of using methanol as a blend with gasoline as motor spirit is receiving increasing attention. Paul Dumanois, chief engineer of Air Service, France, in a paper read before the first International Coal Conference (see Page 161 Proceedings) claimed that the addition of anhydrous methanol to petroleum oils imparted desirable anti-knock qualities and produced a motor spirit very satisfactory in use. The writer is of the opinion that it will be a long time before production can be so increased as to more than supply uses in which the value realized justifies the payment of a much higher price per gallon than could be paid for it as a motor blend. Ignoring its use in place of ethyl alcohol for purposes in which either may be used, there is a large field for increased use for purposes in which it is the only available material. It is the source of formaldehyde. This, in turn, united with phenol, forms Bakelite. With lower cost, the use of this product could be very greatly increased. Were gasoline to rise in selling price and the cost of methanol be lowered by amortization of the plants, coupled with a largely increased output, the time might come when many million gallons a year would be burned in our motor vehicles. But this is something for the future to determine.

The Square Root Chart

(*Continued from Page 41*)

ing increased to the outside range of the chart, the probable error in recording or reading would be magnified by the greatly increased flow through the orifice. On the other hand, the square root chart has 65 circular lines, of logarithmic scale. The low reading would be on lines indicating small volumes also, but as the differential increased the circular lines on the square root chart become more numerous and wider apart, so that recording and interpretation of reading insures greater accuracy of measurement when the orifice is passing larger volumes. The direct reading chart would also tend to insure greater accuracy of indication in that readings are secured from the square root of a logarithmic mean, while the ordinary chart reading is secured on averages only.

STAR CITY, ARKANSAS, GIVES NATURAL FRANCHISE RIGHTS

A franchise has been granted the National Gas Corporation to supply natural gas to Star City, Arkansas. Construction of the transmission line will begin within six months.

SAN ANTONIO LINE TO SERVE INDUSTRIES ENROUTE

The 110-mile 16-inch gas line now under construction by the South Texas Pipe Line Company recently organized subsidiary of the United Gas Company, from the Bee and Refugio County gas fields to Converse, 12 miles northeast of San Antonio, will serve gas to nine towns enroute, according to announcement.

The towns, which will require approximately 12,000,000 cubic feet of gas per day, are Yorktown, Nordheim, Runge, Kennedy, Karnes City, Falls City, Poth, Floresville and Elmendorf. Franchise rights are being sought in other towns also.

At Converse the line connects with the Southern Gas Company's line, another holding of the United Gas interests, serving San Antonio, and will materially increase the supply of gas available for that city.

A number of new industries in San Antonio and in towns enroute will be supplied with gas from this line, among them the Republic Portland Cement Company, San Antonio; San Antonio Sewer Pipe & Manufacturing Company, Saspamco; and the Star Brick & Tile Company at Elmendorf.

This new line is costing approximately $2,750,000 and is expected to be completed around the middle of July. Smith Brothers Construction Company of Dallas is constructing the line.

ARKANSAS NATURAL BUYS GAS PROPERTIES IN LOUISIANA

Arkansas Natural Gas Corporation has announced the purchase of gas distribution systems in Plain Dealing, Junction City, Marion, Belcher, Gilliam, Hooston, Oil City, Bethany, Bossier Junction, Naborton and East Point, in Caddo, Bossier, Webster, Red River, De Soto, Claiborne and Union Parishes in Louisiana, and in Junction City and Strong, in Union County, Arkansas.

The purchase was made from the Moran Corporation of the south, and included franchise rights as well as pipe line systems. Approximately 1,250 customers are served by these properties, it was stated.

BRUNI TO SAN ANTONIO LINE TO BE COMPLETED BY FALL

Construction on the Magnolia Gas Company's line from the Bruni fields in Webb County, Texas, to San Antonio and New Braunfels began May 20, and the line which will be more than 200 miles long, is expected to be completed about September 1.

The line is composed of 14, 18 and 20-inch pipe, with the construction department of the Magnolia Gas Company doing the work. A. O. Smith Company is supplying the pipe and doing the welding.

Gas will be supplied through this line to a number of large industries in and around San Antonio.

T. W. COOK, WICHITA GAS CO. EMPLOYEE, DIES

Theodore W. Cook, househeating engineer of the Wichita Gas Company of Wichita, Kansas, died on June 2, following a major operation. Mr. Cook has been with the company since 1925.

GAS SERVICE CO. GETS BUCKLIN, KANSAS, FRANCHISE

The city of Bucklin, Kansas, early in June granted the Gas Service Company a 20-year franchise for the service of natural or manufactured gas in that city. Operation for the laying of lines will begin soon.

Pioneering New Gas Line Load

(Continued from Page 36)

pumping prospects after the main was installed and so it multiplied the work of selling many times. A picture was carefully painted by the sales representatives, which conveyed the idea of low water costs, greater prosperity, and placed the gas company in the light of a helpful and cooperative friend of the farmer. Enthusiasm ran high, favoring gas engine power. A number of farmers conceived the idea of calling a mass meeting of the community, to discuss gas engine power, to be held in the school house. They wrote the gas company, requesting that a speaker be furnished for the occasion and published a notice of their meeting in the local paper.

The gas company considers each and every one of these people a sincere friend, whom our representatives know by their first names.

GOOD PUBLIC RELATIONS VITAL

This little story illustrates clearly the one important factor in pioneering new gas territory—good public relations and enthusiasm will make these people feel, as they should, that we are public servants who wish to render them a friendly helping hand. Sales made from this angle are comparatively easy.

A very important phase of keeping the public friendly and favorably inclined towards the company, is the manner in which an applicant for gas is handled in a territory to which we cannot extend our main, until more business is obtainable.

Each and every office of the company should have a man of good personality to interview these people. He should explain to them in a tactful manner, just why the company connot serve them at this time. This prospective customer should be treated with great consideration. His problem should be carefully surveyed and analyzed and he should be left with the thought that the gas company wishes to serve him, but is obviously unable to do so at this time. When handled in this manner, this prospective customer in most cases will convert his equipment to gas when the company does extend the main past his residence.

Pioneering business along a new main sums itself into a problem whose solution is to use to advantage all of the natural facilities which are available and overcome by tact and careful manipulation, always in keeping with the highest ethics of business, the obstacles which are encountered.

NATURAL GAS BUREAU TO HAVE INDUSTRIAL EXHIBIT

Plans are under way by the Natural Gas Bureau of Southern California, formerly called the Southern California Gas Bureau, for the setting up of an industrial gas appliance exhibit to be maintained under the direction of the Bureau, and with the cooperation of gas appliance manufacturers of Southern California. C. M. Grow, new business manager of the Southern California Gas Company, has been named chairman of the Natural Gas Bureau. Serving with Mr. Grow are: Frank Weiss, manager new business, Los Angeles Gas and Electric Corporation; Clyde H. Potter, commercial manager of the Southern Counties Gas Company; Charles L. Ferry, power engineer of the Southern Counties Gas Company; C. A. Thorp, chemical engineer of the Los Angeles Gas and Electric Corporation; and George Bowersox, sales supervisor of the Southern California Gas Company. Charles L. Ferry has been named chairman of the industrial committee under whose immediate supervision the exhibit will be set up and opened.

Full details of the operation and maintenance of the industrial exhibit will be given in an early issue of *Western Gas.*

TEXAS PUBLIC SERVICE CO. IS NEW NAME OF SUBSIDIARY

The Austin Gas Company, of Austin, Texas, a subsidiary of the People's Light and Power Corporation of New York, has, according to press reports, changed its name to the Texas Public Service Company.

The change in name was made because of the company's owning a number of properties to which the name of gas company did not fit. Among these properties controlled are the Neches Water Company, the Smithville Electric and Water Company, and the Weimer Electric Company. A. T. Knies of Austin is vice-president and general manager of the new corporation.

J. W. MARTIN TO HANDLE STARGAS SALES FOR LONE STAR

J. W. Martin, chief engineer of the Municipal Gas Company, a subsidiary of the Lone Star Gas Company of Dallas, has been appointed sales manager of the Stargas Department of the company, where he will be in charge of the sales of Stargas, a liquid fuel made up of propane and butane, sold in steel cylinders.

R. F. Foster, superintendent of the Gordon, Texas, gasoline plant of the Lone Star, has been named sales engineer for the department and will actively assist Mr. Martin in supervising sales of Stargas.

Prior to the selection of these men J. R. Jarvis, superintendent of the gasoline plants of the Lone Star, had had full charge of the sales as well as the manufacture of Stargas. The product is manufactured at the Gordon gasoline plant of the company.

DR. E. R. LEDERER IS PRESIDENT OF NATURAL GASOLINE ASS'N

Dr. E. R. Lederer, vice-president of the Texas Pacific Coal and Oil Company of Forth Worth, and vice-president and director of the Natural Gasoline Association of America for the past two years, was elected president of the Association at the annual meeting held May 21-22.

Emby Kaye, superintendent of the natural gasoline plants of Skelly Oil Company, and A. J. Schlosser, holding a similar position with the Barnsdall Oil Company, were elected as vice-presidents. George Ratliff of the General Petroleum Company of California is also a vice-president.

GENERAL UTILITY CO. BUYS TWO COMPANIES, IS REPORT

Bonner Springs, Kansas, Gas Corporation and the Rialto Pipeline Company have been purchased, according to press report, by the General Utility Company, with offices in Kansas City, Missouri, Herington, Kansas, and Wichita, Kansas.

Selling *on a* 200-Town System

(Continued from Page 27)

demonstrations have been weli worth the expense and labor involved, as it is the best assurance to our prospective consumers of our interest in familiarizing them with the appliances consuming the fuel we sell. Last October, which is rather early for heating sales in Texas, we offered our space heaters at a 10 per cent reduction in regular price, if purchased during the month of October; and over 800 heaters were sold during the period.

A number of range sales have been conducted since the establishment of our new business departments. An old stove allowance of 10 per cent of the purchase price of the new range is allowed and terms of $2.00 down, balance in 18 months, are in effect. During these sales a premium of some sort is usually given with each gas range sold. In February of this year we found that we had a rather large stock of 1928 model ranges on hand, and decided to offer a heater valued up to $25.00 with each gas range purchased, in lieu of an old stove allowance. As a result we disposed of 242 ranges during the month. In Greenville, Texas, a town of 2,500 meters, we have sold 100 ranges in the past 90 days. These are all 1928 model ranges and were sold at a 20 per cent discount with no old stove allowance and no discount for cash. All of our resale prices carry a 10 per cent cash discount, except in special cases such as outlined above.

Some of our most successful campaigns have been on water heaters (these finest of domestic load builders), and considering our field, we are rather proud of the results. Practically all of our efforts in this line are confined to automatic storage type heaters. During a campaign last August in our then 18 sales rooms, 400 heating units were sold, over 90 per cent of which were storage units. In this campaign we offered these heaters priced for resale at from $60.-00 to $125.00 for a $2.00 down-payment—balance in 18 months, installation and service free. With each heater we gave a white enameled bath-room heater and found that this gift was very attractive to the consumers, and at the same time, carried out our policy of making the consumer "gas conscious." We are now engaged in another water heater campaign in conjunction with a nation-wide cleanliness campaign. The same prices and terms are in effect as in our previous sale; however, with each heater purchased, a beautiful set of Cannon bath towels or a sanitary kitchen can is offered. The above premiums were selected for carrying out the cleanliness idea. At this stage of the sale results appear to be very good, and we expect to add a considerable number of heaters to our system. We give a great deal of attention to water heating prospects. In fact, the new business department's slogan is, "No Home Is Modern Without Automatic Gas Hot-water Service."

The company now maintains an advertising department, and since beginning merchandising has used newspaper advertising where demonstrations were to be conducted or special announcements made of the opening of merchandise departments, special sales, etc., were carried in the local newspapers. We have secured excellent results by preparing sales circulars to be distributed in each town, either by our own men or by Boy Scouts who are hired for the work. Explicit instructions are given that these circulars are either to be delivered to someone in the house or placed inside. We believe this method of distribution of circulars superior to direct mail, as so many advertising pieces are now sent through the mails. The circulars are made up on a good grade of paper; the appeal is kept as personal as possible, and we endeavor at all times to refrain from exaggerated statements concerning the campaign or the merchandise offered. In this manner we have, we believe, succeeded in keeping the customers' confidence regarding statements made in our advertising.

30,000 METERS—$300,000 SALES

Our first year's new business activities resulted in gross sales of approximately $300,000. Over 3,000 homes were piped for gas and 1,500 gas ranges, 750 water heaters and 3,000 space heaters were placed on our mains. When it is realized that in the 28 towns in which we are now merchandising there are approximately 30,000 meters, some idea may be obtained as to our results. While we cannot take entire credit for adding these appliances (as some would, no doubt, have been purchased from local merchants), we feel safe in saying that our new business department is responsible for the greater part; and as far as the house-piping is concerned, the great majority of the houses would not have been piped had it not been for our offer of time payments. After having carried the heavy investment and expense of opening 28 new store-rooms, with the added handicap of employing inexperienced men at the start, our final statement showed us a small profit at the end of the first year's merchandising program. It must be remembered that included in our expenses were our proposition of the rent, lighting, telephone, stores department and general office expense.

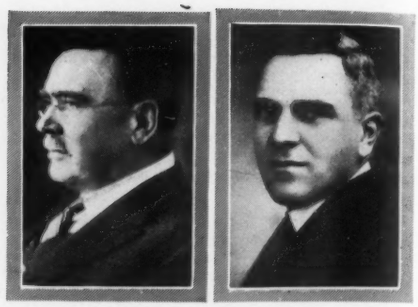
We now feel that with the past year behind us we have gained considerable experience and can correct a lot of errors that were made during the past year, especially along the line of reducing our merchandising cost, and we have every reason to believe that our business for 1929 will exceed that of 1928 at about one-third reduction in cost of operation.

SAN DIEGO CONSOLIDATED SECURES EL CAJON PERMIT

San Diego Consolidated Gas Company, of San Diego, California, has secured a franchise to build and operate a gas system in El Cajon, California.

NEW CATALOG OFF PRESS BY CLEVELAND GAS BURNER CO.

The Cleveland Gas Burner & Appliance Company of Cleveland, Ohio, manufacturer of gas burners, announces a new catalog, No. 29-A, descriptive of the new Barber patented gas burner line. Numerous charts are contained in the brochure, which are of value to the trade in solving heating problems. A specification data sheet contained in the catalog is worthy of special mention.



B. J. Mullaney *C. E. Paige*

A. G. A. Nominations For 1930 Posts Made Known

FOLLOWING are the names which will be submitted to the annual American Gas Association convention in Atlantic City, N. J., October, 1929, for 1930 A. G. A. executive posts, as announced late in June by the general nominating committee:

For President—Bernard J. Mullaney, vice-president, The Peoples Gas Light and Coke Company, Chicago, Ill.

For Vice-President—Clifford E. Paige, vice-president, The Brooklyn Union Gas Company, Brooklyn, N. Y.

For Treasurer—William J. Welsh, president, New York and Richmond Gas Company, Stapleton, Staten Island, N. Y.

For Directors—Two-Year-Term—H. C. Abell, Electric Bond and Share Company, New York, N. Y.; J. S. DeHart, Jr., Isbell-Porter Company, Newark, N. J.; F. C. Freeman, Providence Gas Company, Providence, R. I.; R. W. Gallagher, East Ohio Gas Company, Cleveland, O.; Arthur Hewitt, Consumers Gas Company of Toronto, Toronto, Ont., Can.; F. T. Hulswit, American States Securities Corp., New York, N. Y.; A. B. Macbeth, Southern California Gas Co., Los Angeles, Calif.; P. S. Young, Public Service Electric and Gas Company, Newark, N. J.; Fred A. Miller, S. R. Dresser Mfg. Company, Bradford, Pa.

The following are nominated by Section nominating committees to serve as Section Officers for the Association Year 1929-1930:

Accounting Section: Chairman—J. L. Conover, Public Service Electric and Gas Company, Newark, N. J.; Vice-Chairman, J. I. Blanchfield, the Brooklyn Union Gas Company, Brooklyn, N. Y.

Commercial Section: Chairman—Geo. E. Whitwell, The Philadelphia Company, Pittsburgh, Pa.; Vice-Chairman, Merle E. Skinner, Mohawk-Hudson Power Corporation, Albany, N. Y.

Industrial Gas Section: Chairman, C. C. Krausse, Consolidated Gas, Electric Light & Power Company, Baltimore, Md.; Vice-Chairman, D. W. Chapman, The Peoples Gas Light & Coke Company, Chicago, Ill.

Manufacturers' Section: Chairman, F. G. Curfman, The Improved Equipment Company, New York, N. Y.; Vice-Chairman, E. S. Dickey, Maryland Meter Works, Baltimore, Md.

Publicity and Advertising Section: Chairman, James M. Bennett, The United Gas Improvement Company, Philadelphia, Pa.; Vice-Chairman, Donald M. Mackie, Consumers Power Company, Jackson, Mich.

Technical Section: Chairman, B. W. Pfeiffer, The United Gas Improvement Company, Philadelphia, Pa.; Vice-Chairman, R. G. Griswold, Cities Service Company, New York, N. Y.

Gas Storage Installation Comparative Cost Study

(Continued from Page 25)

TABLE No. 6 CALCULATIONS OF COMPARATIVE TOTAL EQUIVALENT INVESTMENTS AND ANNUAL COSTS ASSUMING 10 PER CENT YEARLY INCREASE IN STORAGE REQUIREMENTS

1	2	3	4	5	6	7	8
Year Installed	Period Elapsed Since 1929 Years	Capital Expenditure Required	Annual Costs (Exclusive of Labor and Interest)	Column 4 Captialized at 6%	Total Equivalent Capital Required at Date of Installation (3 + 5)	Initial Sum Compounded Annually Which Will Provide Col. 6 at Date of Installation or Present Worth of Col. 6	Interest at 7% on Col. 7 (Equivalent Total Mean Annual Cost of Project)
			PROGRAM NO. 1-A—PRESSURE TYPE—500 M. C. F. UNITS				
1929	...	$113,000	$1,300	$21,667	$134,667	$134,667	.....
1930	1	54,700	638	10,633	65,333	61,555	.....
1931	2	54,700	638	10,633	65,333	57,997	.....
1933	4	54,700	638	10,633	65,333	51,484	.....
1934	5	54,700	638	10,633	65,333	48,508	.....
1935	6	54,700	638	10,633	65,333	45,703	.....
1936	7	54,700	638	10,633	65,333	43,061	.....
TOTAL		$441,200	$5,128	$ 85,465	$526,665	$442,975	$31,003
			PROGRAM NO. 2-A—PRESSURE TYPE—750 M. C. F. UNITS				
1929	...	$163,550	$1,911	$ 31,850	$195,400	$195,400	.....
1931	2	80,475	947	15,783	96,258	85,449	.....
1933	4	80,475	947	15,783	96,258	75,854	.....
1935	6	80,475	947	15,783	96,258	67,336	.....
1936	7	26,825	316	5,267	32,092	21,152	.....
TOTAL		$431,800	$5,063	$ 84,466	$516,266	$445,191	$31,163
			PROGRAM NO. 3-A—LOW PRESSURE TYPE—2,000 M. C. F. UNITS				
1929	...	$240,700	$4,628	$ 77,133	$317,833	$317,833	.....
1931	2	13,300	1,558	25,967	39,267	34,858	.....
1933	4	202,000	2,245	37,417	239,417	188,668	.....
1934	5	13,300	1,558	25,967	39,267	29,155	.....
TOTAL		$469,300	$9,989	$165,484	$635,784	$570,514	$39,936
			PROGRAM NO. 4-A—LOW PRESSURE TYPE—4,000 M. C. F. UNITS				
1929	...	$397,300	$6,624	$110,400	$507,700	$507,700	.....
1931	2	13,300	1,558	25,967	39,267	34,858	.....
1934	5	13,300	1,558	25,967	39,267	29,155	.....
TOTAL		$423,900	$9,740	$162,334	$586,234	$571,713	$40,020

Directing Sales Efforts *toward* Profitable Loads

the merchandise they are handling is priced too high. Experience with the gross-profit commission has brought out the fact that the salesmen now urge the company to maintain proper selling prices, arguing that good salesmanship can overcome low-priced competition.

The payment of revenue or load-building commissions based on the value of the equipment sold, from both revenue-building and load-factor standpoints, is most important. A careful analysis was therefore made of the revenue-producing value of each appliance or piece of equipment, as well as the load characteristics of its consumption. It was ascertained in the domestic field that the replacement of a manually-operated tank water heater with an automatic storage water heater occasioned an average yearly increased consumption of 29,000 cubic feet of manufactured gas, the greater part of this consumption coming on the valley of the annual load curve. Analyses were made of the revenue value and load characteristics of the increased gas consumptions of many other appliances and gas usages, such as ranges, manually-operated water heaters, fire-place heaters, incinerators, laundry stove, house heating installations, and various commercial and industrial equipment. Revenue or load-building commissions and percentages were then set up to automatically direct the efforts of the salesmen toward the desired objectives. The revenue commission as set up caused the selling of a much

(Continued from Page 31)

greater percentage of large-revenue-producing and off-peak-consumption equipment. The effort put forth by salesmen to install better revenue-producing equipment will be greater where the reward is larger. It is well to remember the more desirable the business secured the more liberal the revenue commission should be.

We find from actual experience that salesmen soon learn that cash down-payments are obtained much more easily than they at first thought possible. Also they now realize that cancellations and returns are less apt to occur when some cash is collected in advance. Down-payments have increased by at least 100 per cent, and a surprisingly large number of sales have been made—full cash with the order.

A total of 65 territory gas sales representatives were paid upon this plan during 1928, of which 26 were domestic gas representatives, 30 domestic house heating representatives, 4 hotel and restaurant representatives, and 5 industrial gas sales engineers. Only the domestic gas division operated under this plan without change in the number of men employed for the year as compared with the number employed during the preceding year of 1927. A comparison of the results of this division then operating under the plan above described with the results accomplished during the preceding year, at which time a merchandise percentage plan was in effect, reveals the following facts:

Gas new business expenses for 1928 were reduced 31 per cent under those of 1927, although gas merchandise sales were increased by 13 per cent, and at the same time sales representatives' compensations were increased by 33 per cent. The effect of the combination of load-building and merchandise-profit commissions was to divert the efforts of the salesmen from the seeking of more merchandise volume to the securing of extremely desirable business. The sales of large-consumption equipment such as storage water heaters, incinerators, etc., increased enormously, while sales of lower-revenue value equipment, such as manually-operated water heaters and gas range replacements, fell off. Storage water heater sales for 1928 were 111 per cent above those of 1927, and a few dozen incinerators were sold as compared with practically none during the previous year. The domestic manufactured-gas revenue was increased 11.6 per cent over the manufactured gas revenue of the previous year in spite of the steady inroads of the delicatessen stores, the bakeries, the laundries, and the apartment-house builders upon our domestic sales per customer. This domestic revenue increase was all the more remarkable on account of the removal of customers from the domestic gas classification as rapidly as they installed domestic all-gas house heating equipment. Our do-

mestic house heating revenue is not included in our domestic classification, but is reported separately.

In the house heating division several thousand domestic all-gas house heating customers were secured on this compensation schedule at a selling expense of considerably less than $10 each.

The industrial and commercial divisions did not commence to operate under this schedule until several months after the first of the year. These divisions accomplished during 1928 the sale of industrial and commercial gas-consuming equipment totalling 82 per cent above the sales for 1927. On account of this large increase it is difficult to accurately judge the effect of the new compensation plan, but it is significant that industrial and commercial new business expenses decreased 46 per cent below those of 1927, notwithstanding that much more desirable load was secured, and that salesmen's compensations were increased by 43 per cent.

We have sought to offer the greatest possible compensation incentives to stimulate tremendous industry, evening calls, and the saving of every cent possible on installation costs, delivery expenses, etc. The salesman can save many dollars per month by extreme care in estimating piping costs, in routing his orders, and in being a good trader. It is apparent that a much higher percentage can be paid upon gross merchandise profits than could be paid upon gross merchandise sales; also that much higher percentages can be paid the salesman whose commissions are charged against a drawing account from a zero base than could be paid upon a salary-plus base.

We are paying gross profit commissions running as high as 40 per cent, which means that the salesman shares with the company in the effects of his dealings upon gross merchandise profits and losses, upon a 40-60 basis. Putting him into partnership with the company upon such a high percentage basis sharpens his trading effectiveness immensely. At the same time all appliances and installations are sold upon fixed standard prices and schedules. additional volume through reducing selling prices being sought.

Our gas-revenue commissions are based upon the increased-annual-revenue-value of each piece of equipment and vary from as low as 1 per cent on poor-load-factor, low-sales-resistance, or dump-rate contracts to as high as 50 per cent in certain instances of off-peak, high-yield, high-sales-resistance orders.

A five per cent commission is paid on all cash collections turned in as down-payments in advance of the execution of the orders.

The accounting in connection with this method has not proven difficult. Commissions are not computed on each sale, but all items are merely listed in a commission ledger and the percentages are computed on the totals for each salesman at the end of each month.

In conclusion, we are much indebted to the gas associations of the country and the many splendid papers and discussions on salesmen's compensation through which the pooled experiences of the industry is available to all who care to study. Our present Denver's salesmen's compensation plan has apparently yielded splendid results during the past 17 months; but already we are foreseeing certain desirable changes in various details of its application. We desire to avail ourselves of the experiences of other gas sales organizations, and to discard the old for the new as better methods are developed.

Drying Seaweed *by* Gas Heat

(Continued from Page 28)

cutter where it is cut into one-inch lengths. From there it goes to a set of rolls where the "bulbs" are crushed, thence to the bin from whence it is fed to the drying kiln by a screw conveyor.

The kiln, of tree-eighth inch steel, is 60 feet long by six feet in diameter, with a downward pitch of one-half inch to the foot. It makes two revolutions per minute.

The problem was to completely dehydrate the kelp, which is combustible, in this distance of 60 feet and deliver an even, unscorched product. The kelp carries 90 per cent moisture and naturally has a tendency to mass. For the initial 20 feet the kiln is equipped with a series of projecting rods varying from six to 24 inches in length and spaced at uneven intervals of about eight inches. These keep the wet heavy mass almost in suspension on its journey through the kiln at the rate of one and one-quarter tons per hour.

With a knowledge of the combustibility of the product in mind, the first furnace was built with a flame travel of 20 feet before reaching the kiln. It was 10 feet long, 4 feet wide and 8 feet high inside, and divided into an upper and lower compartment. Combustion took place in the lower; the heat traveled its entire length, thence rose to the upper compartment and traveled from there into the kiln.

The original expectation was that a temperature of 900 degrees in the furnace would result in a temperature of 300 at the discharge end of the kiln.

Two burners of the "blast" type were installed with an approximate consumption of 5,000 cubic feet of gas per hour at two pounds initial pressure. When operations were started the recording pyrometer at the intake of the kiln showed 1200 degrees but the highest registration that could be obtained at the discharge end was 100 degrees; and the product still contained moisture.

Attention was then diverted to the fan which removed the saturated air from the kiln. This fan, the old type with shallow radial blades and with a rotar six feet in diameter, was travelling at the rate of 200 revolutions per minute. The speed was increased to 241 r.p.m., resulting in an immediate increase to 200 degrees at the discharge, with a resultant dry product.

It was obvious by this time that the kelp, while combustible, did not scorch easily and it was decided to fire direct into the kiln through the upper combustion chamber. Atmospheric burners with a sufficient capacity to burn 5,000 cubic feet of gas at one pound initial pressure were installed. The lower chamber was entirely sealed off. This change has proven entirely satisfactory and has lowered the cost per ton considerably.

In order to further assist operation a thermostat was installed at the discharge end of the kiln and a constant temperature maintained at that point.

A duplicate kiln is being installed alongside the original one. The furnace installation, however, on this second kiln will be entirely different. A furnace and burner combination recently placed on the market is being installed. This combination has proven very successful at San Pedro fish canneries in the drying of meal. The original furnace will be replaced by this combination also. The fan on the new kiln is a "Sirocco" type capable of handling 28,000 cubic feet per minute, and a similar one will replace the fan on the old kiln. We believe we are approoaching perfection in this last installation. The furnace temperature will be lower, the capacity per hour will be increased and the cost per ton reduced.

In this new industry, gas has again demonstrated the wide field over which it may be applicd. The management of Philip R. Park, Inc., is happy in its use, and naturally we are happy in developing a new application to a 24-hour load of 5,000 cubic feet of gas per hour.

WORK PROGRESSING RAPIDLY ON MONROE-ATLANTA LINE

One hundred miles of the Monroe-Atlanta gas line being laid by the Southern Natural Gas Corporation is expected to be completed by July 13, according to the report of contractors now engaged in constructing the line which will supply natural gas to a number of important Mississippi, Alabama, Georgia and Tennessee cities.

Ford, Beacon & Davis are the general contractors for the line with Williams Brothers Inc., of Tulsa, Oklahoma and the Oklahoma Contracting Company of Dallas, Texas, as sub-contractors. Williams Brothers are now operating on the Louisiana unit and the Oklahoma Contracting on the Mississippi division. Actual construction of the line began about June 1 and it is expected to be completed by December 31.

R. W. CAMPBELL ATTENDS HEATING CONFERENCES IN THE EAST

R. W. Campbell, engineer and general sales manager of the Payne Furnace and Supply Company of Beverly Hills, California, following the convention of the Natural Gas Department of the American Gas Association in Kansas City, left on an extended trip that will take him to a majority of the leading cities of the United States. He will represent his company in conferences concerning heating problems.

EVANSTON, WYO., BRANCH LINE IS UNDER CONSTRUCTION

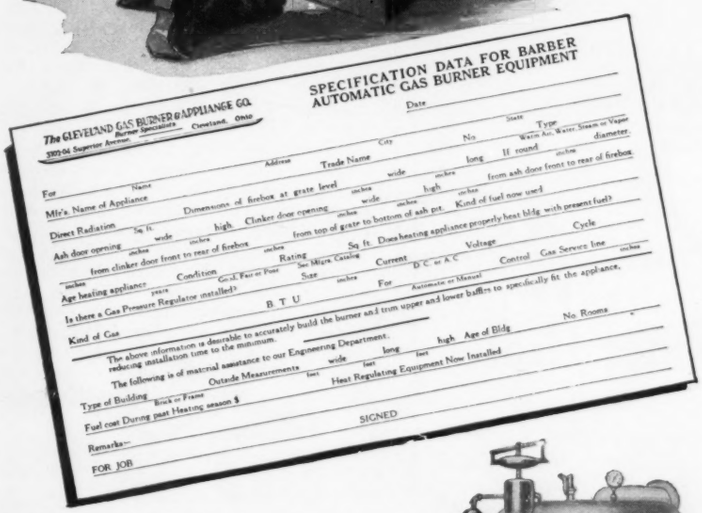
A branch line that will provide Evanston, Wyoming, with gas from the Baxter Basin-Utah line is now being constructed, and consumers of Evanston will have natural gas by the middle of August. More than two miles of distribution mains are already complete.

COMMONWEALTH PUBLIC SERVICE CO. BUYS SEDAN HOLDINGS

The Commonwealth Public Service Company of Chicago, according to press report, has purchased the Sedan Gas Company, of Sedan, Kansas, thereby ending a 24-year term of service on the part of the Sedan company.

Get Ready for the Greatest Conversion Season in History

"Show Them How It's Done With Barber Automatic Jet Gas Burners"



The GLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3702-04 Superior Avenue, Cleveland, Ohio

SPECIFICATION DATA FOR BARBER AUTOMATIC GAS BURNER EQUIPMENT

Date

For ____ Name ____ Address ____ City ____ No. ____ State ____

Mfr's Name of Appliance ____ Trade Name ____ Type ____ Water Ac. Water Steam or Vapor

Direct Radiation ____ Sq. ft. Dimensions of firebox at grate level ____ inches wide ____ inches long ____ If round ____ inches diameter

Ash door opening ____ inches wide ____ inches high Clinker door opening ____ inches wide ____ inches high ____ inches from ash door front to rear of firebox

____ inches from clinker door front to rear of firebox ____ inches from top of grate to bottom of ash pit. Kind of fuel now used

Age heating appliance ____ years Condition ____ Good, Fair or Poor Rating ____ Sq. ft. Does heating appliance properly heat bldg. with present fuel?

Is there a Gas Pressure Regulator installed? ____ See Mfg's Catalog Size ____ inches Current ____ For ____ Automatic or Manual

Kind of Gas ____ B T U ____ Voltage ____ D C or A C Control ____ Cycle ____ Gas Service line ____ inches

The above information is desirable to accurately build the burner and trim upper and lower baffles to specifically fit the appliance, reducing installation time to the minimum.

The following is of material assistance to our Engineering Department.

Type of Building ____ Brick or Frame Outside Measurements ____ feet wide ____ feet long ____ feet high Age of Bldg. ____ No. Rooms ____

Fuel cost During past Heating season $ ____ Heat Regulating Equipment Now Installed ____

Remarks— ____ SIGNED ____

FOR JOB ____

YESTERDAY'S

Makeshift Methods Might Do—but

TODAY'S

Specialization and the Barber "Tailor-Made" Plan Bring Real Success — Without Guess-Work

CONDITIONS change practically overnight in many industries . . . and, in the Gas Conversion Market a decided change has taken place.

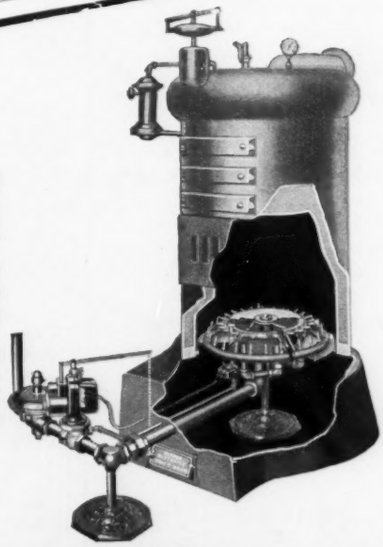
The pioneer days are gone—involving the necessity of convincing the trade that there is a MARKET for good Gas "Conversion Burners." Forever past is the equally makeshift method of merchandising Gas Conversion Burners.

The AUTOMATIC era is in vogue—and foremost in evidence is the universally popular demand for the Barber AUTOMATIC Jet Gas Burner System . . . the most scientific, completely self-controlled burner with the highest efficiency in the gas conversion field.

You don't have to *guess* any longer as to the correct burner equipment to order. You don't have to "sweat blood" over *laborious installations.* You don't *shrink your profits* from burdensome overhead. *You simply use the Barber Specifications Data Sheet.* Fill in the information required. Send it to us. We then furnish a Barber "Tailor-Made" Burner Equipment based on these specifications. Your installer quickly completes the installation and your sale is accomplished with *clean profits.*

Ask for your supply of Specification Data Sheets, containing valuable data to be used by your salesmen to order Barber "Tailor-Made" Assemblies—designed specifically to fit the Boiler, Furnace or Appliance for which they are intended.

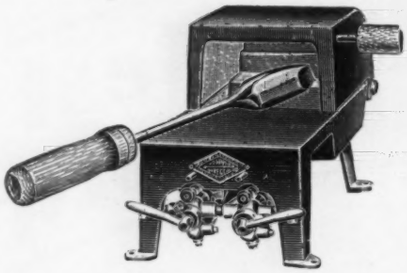
Because of the greatly increased demand for Barber AUTOMATIC Gas Burners, we invite correspondence from Direct Factory Representatives and Distributors that have experience selling the Heating Trade and Gas Companies.



The CLEVELAND GAS BURNER & APPLIANCE CO.
Burner Specialists
3702-04 Superior Avenue. Cleveland, Ohio

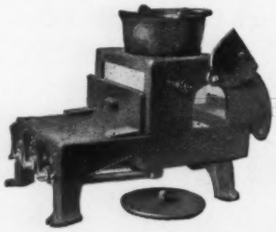
BARBER *Automatic* JET GAS BURNERS

Shop men like this Bench Furnace



The Johnson No. 101 Bench Furnace is one of the most popular furnaces on the market. We believe that more of them are used in America than any other furnace made. This widespread popularity is good evidence of quality. Its many uses and features are described in our free catalog. Write for it!

A Popular Favorite! Johnson



No. 118 Combination Bench Furnace

Its compact form, its efficiency, strength, and versatility, make this famous furnace a popular favorite wherever soldering, heat-treating, and metal-melting services are performed. It operates without forced air blast. Write for free catalog, giving complete description of its uses and exclusive features.

JOHNSON GAS APPLIANCE CO.
Cedar Rapids IOWA

Pacific Coast Representative: C. B. Babcock Co.,
135 Bluxome Street, San Francisco

HERE'S A LEADER

For Your Appliance Department

The Trooper Automatic Water Heater

You can sell it to your customers as low as *$60.00!* (Or without the Automatic Safety Pilot, as low as $55.00.)

Full equipment includes an Automatic Safety Pilot and a Guaranteed Thermostat.

Heater beautifully finished in ivory enamel and proportioned to occupy the least possible space.

Extra heavy Tank made of Copper Alloyed Steel.

Heavy Insulation around Tank. Brass hot and cold water connections.

Equipped with Drain Cock and Dirt Trap.

Write for unprecedented wholesale prices.

Troop Water Heater Company
Pittsburgh, Pa.

Southern Office & Warehouse,
2625 Elm St., Dallas, Texas

Branches in all Principal Cities.

S. W. PUBLIC SERVICE ASSN. TO HAVE ADVISORY COUNCIL

AT A recent meeting held in Dallas, Texas, the governing body of the Southwestern Public Service Association decided to discontinue separate conventions of the Association and to encourage its membership to attend the Regional Conventions of interest to the crafts represented. Provision is made, however, by the governing body for group and sectional meetings at such times and place as will be profitable to the membership.

Regional Conventions especially mentioned in connection with the above decision were the Southwestern Divisional meeting of the Natural Gas Department of the American Gas Association and the Southwest Geographic Division of the National Electric Light Association.

To take the place of the annual meeting of the Association, an Advisory Council, consisting of one representative from each of the member companies was created. The Council will meet from time to time in the interest of the general affairs and policies of the Association and will elect the Executive Committee.

The Executive Committee has full charge of the affairs of the Association, which represents as a body the interests of the gas, the electric, the street railway and telephone public service companies in Texas and Louisiana. Officers and Executive Committee selected for the year 1929-1930 are:

President, Knox Lee, Southwestern Gas & Electric Company, Marshall, Texas. First vice-president, chairman Gas Section, Frank L. Chase, vice-president, Lone Star Gas Company, Dallas, Texas. Second vice-president, chairman Electric Section, J. W. Carpenter, president, Texas Power & Light Company, Dallas, Texas. Third vice-president, chairman Railway Section, W. B. Tuttle, president, San Antonio Public Service Company, San Antonio, Texas.

Other members of the Executive Committee are: George H. Carter, vice-president, Texas Utilities Company, Marlin, Texas; J. G. Holtzclaw, vice-president, Gulf States Utility Company, Beaumont, Texas; W. L. Prehn, general manager, Southwestern Bell Telephone Company, Dallas, Texas; treasurer, R. G. Soper, vice-president, Dallas Gas Company, Dallas, Texas; secretary, E. N. Willis, Dallas, Texas.

T. O. BANTA NAMED SUPT. OF MEASUREMENT FOR UTAH CO.

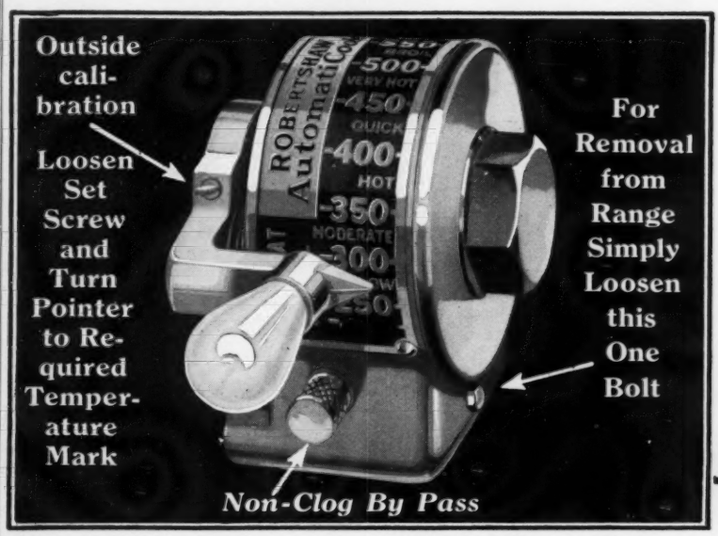
T. O. Banta, chief positive meter and regulator inspector for the Lone Star Gas Company, has been appointed as superintendent of measurement for the Western Public Service Corporation of Salt Lake City, Utah, constructing the natural gas line from the Baxter Basin fields in Wyoming to points in Utah.

Mr. Banta has been associated with the Lone Star for the past nine years and will assume his new duties in Utah the middle of July. R. M. Scofield succeeds to the position of chief meter and regulator inspector with the Lone Star.

OKLAHOMA NATURAL TO LOOP LINE TO SAN ANGELO, TEX.

The Oklahoma Natural Gas Corporation, according to report, will loop its gas line between the gas fields near Coleman to San Angelo, Texas, to augment the supply of gas at the latter place. The present line serves Coleman, Ballinger, Rowena and Miles enroute to San Angelo. The 38-mile loop line will also insure against the gas supply being cut off by the rising of the Colorado River at Ballinger.

GAS COMPANIES and STOVE DEALERS



Appreciate the Exclusive Advantages of the "B" Type

ROBERTSHAW AutomatiCook TRADE MARK

Outside Calibration. Takes just a few seconds to change the temperature setting if required, by means of a convenient set-screw on the temperature pointer. Merely loosen the set-screw, move the pointer to the proper temperature mark on the dial, and then tighten the set-screw.

Quick Removal. Should the "B" Type AutomatiCook become damaged for any reason, necessitating replacement, it can be removed without disconnecting the range or disturbing the linings or the piping. Requires no mechanical servicing or repairs on the job. Simply loosen one bolt, replace the Thermostat with a spare and tighten the bolt. The job can be done in less than a minute's time.

Non Clog By-Pass Pilot. Will not clog nor bind. Always moves freely and maintains its adjustment. Eliminates servicing, adjusted by turning either to the right or left.

Non-Corrosive Valve Seat. The AutomatiCook is now being equipped with a Raised Non-Corrosive Valve Seat which will resist the corrosive action of gas, eliminating any possible trouble from this source.

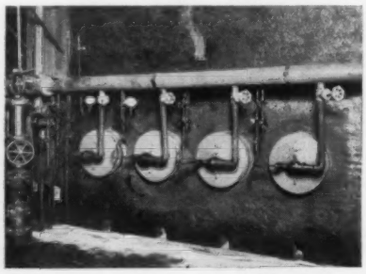
Write for 8-Page Folder, illustrating and describing the above advantageous features.

ROBERTSHAW THERMOSTAT CO.

Youngwood, Penna.

The Robertshaw AutomatiCook is now used on more than 80 leading makes of Gas Ranges

Forney Combination Gas & Oil Burner for Power Plant and Industrial Use



Forney Burners are used by Central Stations for large boilers and high ratings as shown by the following installations:

(1) Oklahoma Power & Water Company, Sand Springs, Okla. 3 1000 h.p. Sterling boilers, 325% normal rating.

(2) Pacific Gas & Electric Company, San Francisco, Calif., 2 822 h.p. Sterling boilers, 200% normal rating.

(3) American Sugar Refinery Company, Three Oaks, La., 20 566 h.p. B & W boilers, 225% normal rating.

(4) Texas Electric Service Co., Eastland, Texas, 2 1190 h.p. Walsh & Weidner, 335% normal rating.

(5) Texas Gulf Sulphur Company, Boling, Texas, 5 1500 h.p. Sterling boilers, 300% normal rating.

(7) Louisiana Power & Light Company, Sterlington, La., 1 1619 h.p. Walsh & Weidner, 600% normal rating.

(8) Memphis Power & Light Company, Memphis, Tenn., 4 1512 h.p. B & W boilers, 225% normal rating.

(9) Dallas Power & Light Company, Dallas, Texas, 4 1700 h.p. B & W boilers, 300% normal rating. 1 1700 h.p. B & W Boiler, 400% normal rating.

(10) Fort Worth Power & Light Company, Fort Worth, Texas, 3 1700 h.p. B & W boilers, 300% normal rating. 4 686 h.p. B & W boilers, 200% normal rating.

(11) Houston Lighting & Power Company, Houston, Texas, 3 2000 h.p. B & W boilers, 300% normal rating.

Write for literature

Forney Combustion Engineering Company

305 Thomas Bldg., Dallas, Texas

Lone Star *to* Build 135-Mile Gas Line

CONSTRUCTION of the 135-mile gas line planned by the Lone Star Gas Company, from Petrolia, the junction point of lines originating in Oklahoma and the Panhandle of Texas, to Fort Worth and Dallas, will be begun around the middle of July. This unit is the largest in the expansion program recently announced by the company, and will be the third line between these points. One of the lines which the new project will parallel is of 16-inch pipe and the other, which is leased from the government, is 10 inches in diameter.

Between four and five hundred men will be required in the construction of the line. These will be divided into two gangs, one of which will probably start on each end of the line. The capacity of the line will be 100,000,000 cubic feet of gas daily.

Another extension which the company plans is a line running northwest from Gainesville, Texas, through Lindsay, Myra, Muenster, and St. Joe, a total distance of 20 miles. A compressor plant is also planned for Gainesville, which is only a few mlies distant from the junction point of a line originating in McClain and Garvin counties in Oklahoma and a branch line serving Denison, Bonham, Paris and Durant. The cost of the compressor station will be approximately $70,000. A 10-inch line will also be laid from Gainesville Junction to the gasoline plant at Gainesville, a distance of four miles.

The Lone Star also plans to extend its line ending at Desdemona to Sipe Springs, in Comanche county, Texas, a distance of 24 miles. The pipe is to be 16 inches in diameter. A compressor station will also be constructed at Sipe Springs. Another line which will be 10 inches in diameter and 20 miles in length will be constructed from the company's gasoline plant at Ranger to the gasoline plant of the Superior Oil Company in the Moran district in Shackelford County, Texas.

Other plans call for the piping of gas to Hamilton, Granbury, Glen Rose, Meridian, Whitney, Lott, Rosebud, Morgan and Clifton, in Hood, Somervell, Bosque and Falls Counties in Texas. The line serving a number of these towns will tap the two 18-inch lines of the company crossing Hood County at a point north of Granbury. Gas will be distributed in these towns by the Community Natural Gas Company, subsidiary of the Lone Star. Fifty miles of 6-inch line, 12½ miles of 3-inch and 36 miles of 4-inch, make up the project, exclusive of the distributing systems.

Whitney, lying 10 miles west of the line to Waco, will also be served gas through a four-inch extension, and Grapevine in Tarrant County will receive gas through a five-mile, four-inch line from the Oklahoma-Dallas trunk line. A six-mile, four-inch line will be constructed from Van Alstyne to Howe in Grayson County, Texas.

SAN DIEGO CONSOLIDATED OPENS NATIONAL CITY OFFICE

The San Diego Consolidated Gas and Electric Company of San Diego, California, opened a new district office at National City, California, on June 6, according to Wm. F. Raber, vice-president and general manager of the company. Howard Glasgow is district agent in charge of the new office, which is located in a district where the company serves approximately 10,000 consumers.

R. S. Reading Named *to* Post *with* Lone Star

H. E. DANNER, vice-president of the Texas Cities Gas Company with headquarters at Dallas, Texas, has announced the appointment of R. S. Reading as manager of the El Paso and Juarez distributing properties of the Texas Cities Company.

R. S. Reading

Mr. Reading was formerly general manager of the Southern Cities Distributing Company at Texarkana, Arkansas and Texas, and had been associated with this property for the past seven and one-half years. At the time of his departure from Texarkana he was president-elect of the Rotary Club, a director in the Chamber of Commerce, and a member of the City Park and Planning Committee.

Mr. Reading was born in Richmond, Texas, and is a graduate of the Texas A & M College where he received the degree of Bachelor of Science in Electrical Engineering. In 1917 and 1918 he was located at El Paso as an engineer with Stone & Webster.

Mr. Reading went to his new post on the 15th of June, a day or two prior to the time natural gas was turned into El Paso mains.

C. H. Price, associated with the industrial department of the El Paso Gas Company, has been appointed sales manager of the property in charge of both industrial and commercial sales, and W. E. Boyd, formerly with the Carlsbad, New Mexico, plant of the Pecos Valley Gas Company has been named as supervisor of district sales.

Other appointments announced by the Texas Cities Gas Company are those of Brian Wood as supervisor of sales at the Galveston property, and C. A. Coughlin as supervisor of sales at Waco. Mr. Wood was formerly commercial manager at the San Angelo, Texas, property of the Oklahoma Natural Gas Corporation and Mr. Coughlin was associated with the Houston Natural Gas Company at Victoria, Texas.

MAJOR STRICKLER IS FEATURED IN C. OF C. PUBLICATION

The Kansas Citian, official publication of the Chamber of Commerce, Kansas City, Missouri, in a recent issue, carried an interesting story concerning the life of Major T. J. Strickler, general manager of the Kansas City Gas Company. The story gave in review the outstanding contributions of Major Strickler to the development of the city.

R. C. ALEXANDER WINS IN WATER HEATER SALES CONTEST

In a recent water-heater contest staged by the Washington Gas and Electric Company of Tacoma, Washington, Ray C. Alexander of the Grays Harbor district took first prize. Mr. Alexander was the leading salesman among 200 employees who took part in the contest, and won a trip to the Northwest Regional meeting of the Pacific Coast Gas Association, which was held in Victoria, B. C., June 7-8.

MAY SHIPMENTS LARGEST IN HISTORY

MAY put a new and higher peak to the constantly increasing sales of Hotzone Gas Water Heaters. And all these sales were to Gas Companies, *including four of the largest in the country who, from the very first have sold — and are still selling — Hotzone exclusively!*

Hotzone is a fine water heater backed by the great name of Welsbach. It provides every service required of a water heater, all at a price within the reach of the average consumer. Long association with Gas Company requirements assures from Welsbach the kind of attention and promptness of shipments which help sales to grow. Welsbach Co., Gloucester City, N. J.

Member Pacific Gas Association

Member American Gas Association

The Magic Way Company

Gas Heating Devices

including

"Magic Way" Gas Furnaces

"Magic Way" Control Valves and Switches

"Potter" Radiators

"Steel Made" Radiators

"Cole" Floor and Wall Heaters

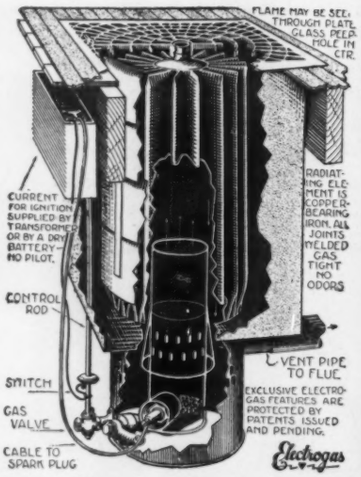
"Hall" Floor Furnaces

Manufactured by

Magic Way Company

National City San Diego California

Electrogas


FLAME MAY BE SEEN THROUGH PLATE GLASS PEEP HOLE IN CTR.
CURRENT FOR IGNITION SUPPLIED BY TRANSFORMER OR BY A DRY BATTERY—NO PILOT.
RADIATING ELEMENT IS COPPER-BEARING IRON. ALL JOINTS WELDED GAS TIGHT NO ODORS
CONTROL ROD
VENT PIPE TO FLUE
SWITCH
GAS VALVE
EXCLUSIVE ELECTROGAS FEATURES ARE PROTECTED BY PATENTS ISSUED AND PENDING.
CABLE TO SPARK PLUG
Electrogas

—The Hoover properties at Stanford, as well as the Officers' Quarters, San Francisco Presidio, are heated by these remarkable floor furnaces.

Manufactured in San Francisco

Electrogas

PATENTED

Martin Unit Gas Furnaces

ARE THE RESULT OF 38 YEARS HEATING EXPERIENCE

MADE IN FOUR SIZES

Electric, Thermostat or Manual Control Approved by A. G. A. Laboratory and by the City of Los Angeles

Write for your copy of "Modern Heating Methods"

PHILLIPS HEATING, VENTILATING & MFG. CO.

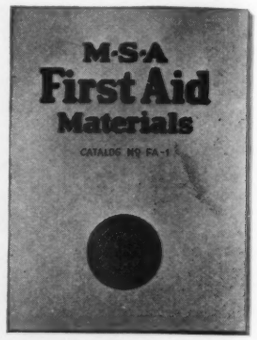
1710 W. Washington St.
Los Angeles, California

Live Agents Wanted

TESTING LABORATORY AGA APPROVED

MINE SAFETY APPLIANCES CO. ISSUES FIRST-AID BROCHURE

Mine Safety Appliances Company, manufacturer and distributor of safety appliances and first aid materials, has issued a new booklet descriptive of the company's line of first aid equipment. The brochure is attractively bound with a stiff cover, and is styled as Catalogue No. FA-1.



Each of the Mine Safety Appliance Company's First Aid Materials is described in detail, giving special features and methods of application and use. The booklet is adequately illustrated, covering equipment for home, industrial, mine, and contest use. Copies may be obtained by addressing the advertising department of the company at Braddock, Thomas and Mead Streets, Homewood Station, Pittsburgh, Pennsylvania.

GEO. D. ROPER CORP. TO HAVE $1,000,000 PLANT

Consolidation of all units of the Geo. D. Roper Corporation in a new $1,000,000 plant on Black Hawk Avenue in Rockford, Illinois, is announced by the company through Mabon P. Roper, president. Construction of the new buildings is expected to begin immediately, and the plant, which will have a floor space of 180,000 square feet, will be located on a 50-acre tract of land near the C. B. & Q. right of way. The corporation produces more than 75,000 domestic gas ranges yearly.

HENRY L. DOHERTY RETURNS TO ACTIVE ADMINISTRATION

Henry L. Doherty, after an illness and a recuperative period lasting about two years, returned to active administration of the Henry L. Doherty & Company on June 3, when he appeared at a company meeting in the Hotel Traymore at Atlantic City. Two hundred men from various parts of the country attended the meeting and took part in the ovation of applause that greeted the executive on his return.

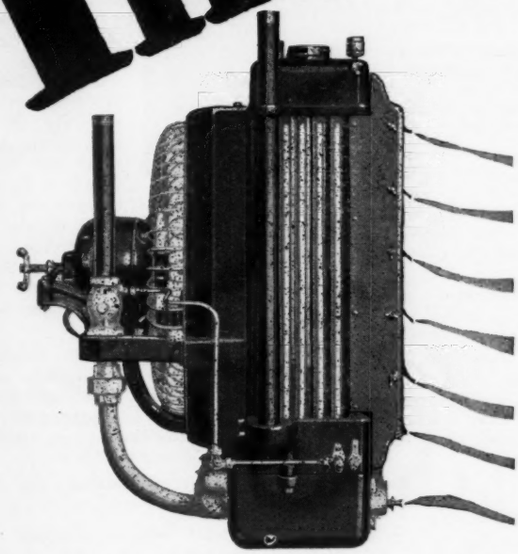
A. O. SMITH CORP. PUBLISHES DESCRIPTIVE BULLETIN

"The New Way" is the name of a booklet just from the press, published by the A. O. Smith Corporation, manufacturer of steel products, of Milwaukee, Wisconsin. Bulletin 505, as the brochure is styled, describes SmithWelded pipe for oil and gas transmission, and reviews some of the major contracts completed by the corporation during the past months.

L A. G. AND E. TO HOLD ANNUAL INAUGURAL PARTY AND BALL

The Employees' Association of the Los Angeles Gas and Electric Corporation will hold its annual Inaugural Party and Ball at the Shrine Auditorium in Los Angeles on July 9. This annual affair takes the form of a dinner, vaudeville entertainment and dance.

Industrial Heat



in its most efficient, flexible and economical form!

SELF-CONTAINED gas burning units that deliver heat in just the right spot, just what is necessary—and no more; just when needed—and no longer! No expensive boilers and steam lines required; no lecensed firemen. Instead—automatic, individually controlled heat . . . instant heat, without waste, at the turn of a valve. Such is the economy, flexibility and efficiency of Humphrey Industrial Unit Heaters. And they are easy and surprisingly inexpensive to install. Put them anywhere, suspended at any distance from the ceiling. Thermostatic control makes them ideal for kilns, as well as for open factory space. Let us send our new catalogue, describing and illustrating this modern method of industrial heating.

The Humphrey
Industrial Unit Heater

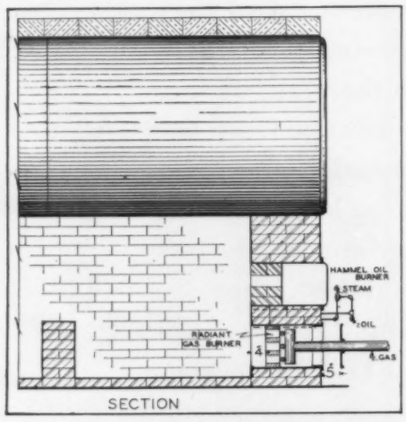
Pacific Coast Manager
C. B. BABCOCK
135 Bluxome St. San Francisco

Manufactured by
General Gas Light Co.
Kalamazoo, Mich.

WEBSTER RADIANT GAS BURNERS
IN THE POWER FIELD

As a source of gas load, there is no more attractive field than that of power generation — through the use of Webster Radiant Gas Burners. There's a Webster Burner for every type of power boiler from 30 H.P. up! These burners range in capacity from 30 to 330 H.P. per burner. They are easy to install with negligible alterations. They offer economies in fuel, advantages in capacity and flexibility, and a unique ability to meet emergency overloads and operate at high ratings without "puffing" or "vibrating."

We're here to help you sell gas load—with advice, service and sales aid.



Sectional view of Webster Radiant Gas Burner as applied to H. R. T. Boilers without grates.

WEBSTER ENGINEERING COMPANY
Tulsa, Okla.
DIVISION OF
The Surface Combustion Co. Inc.

UNITED GAS CO. GIVES FAVORABLE REPORT TO STOCKHOLDERS

In a letter sent stockholders of the United Gas Company one year after its organization President O. R. Seagraves stated that the company has an authorized and outstanding 100,000 shares of $7.00 cumulative preferred stock without par value, and 2,500,000 shares of common stock authorized without par value.

It was also stated that the company had no funded debt and that there would be 1,341,000 shares of common stock outstanding after all the rights which have been underwritten by the company's bankers have been exercised.

"The balance sheet, as of March 31, 1929, of the company and its controlled companies, showed total assets of $98,387,714.13," the letter stated, and the gross revenues for the first quarter of the year amounted to $3,476,256.10.

It was also brought out that the sum available for reserves was $924,139.69, after the operating expenses and maintenance and local taxes were deducted, as well as the interest on the funded debt, and dividends on preferred stock and minority common stock interests, together with the Federal taxes and dividends on stock of the United Gas Company.

The total number of customers served directly and through companies in which the United Gas has a substantial interest is more than 135,000, and the miles of gas line maintained is 2,658. After completing the projects underway and those planned, the United Gas Company will have a direct interest in gas lines totaling more than 4,600 miles.

CONSOLIDATION PLANS FOR TEXAS COMPANIES ARE ANNOUNCED

Plans are complete for merging in one company the Texas interests of the Stamford & Western Gas Company, the Arkansas Western Gas Company, under which the Arkansas interest are operating and the Northwest Texas Gas Company which has headquarters at Vernon, Texas. This latter company serves 13 towns in northwest Texas through 122 miles of main which taps the Stamford & Western and Northern Texas Utilities line. The company also has projected a line in Oklahoma from the gas field at East Prairie to Atoka and Coalgate.

The Stamford & Western Gas Company line begins at Chillicothe in Wheeler county, Texas, and extends due south to Stamford, where the company has headquarters, and then westward to Rotan.

The property value of the merged companies is estimated at $5,300,000, according to W. R. Stinnet, general manager of the Northwest Texas Gas Company.

CIMARRON UTILITIES CO. SERVES EIGHT MORE OKLAHOMA TOWNS

The Cimarron Utilities Company of Guymon, Oklahoma, which supplies natural gas service to Goodwell, Guymon, Hooker, Texhoma, Optima and Tyrone, is planning to extend its service to Forgan and Beaver. The town board of Beaver recently passed an ordinance granting the company the right to lay gas mains in the city. The system is expected to be ready for occupancy by October 1. A new supply line will be laid from Tyrone to Forgan and Beaver.

L. A. G. AND E. NOTES DECREASE IN ACCIDENTS SINCE 1926

The gas works of the Los Angeles Gas and Electric Corporation has had a 78 per cent reduction in accidents since 1926, according to J. R. Rowe, safety engineer.

P. G. *and* E. Sales Course Directed *by* J. H. Gumz

UNDER the direction of J. H. Gumz, who is in charge of industrial gas sales for the Pacific Gas and Electric Company, this utility is conducting an industrial salesmens' course, designed to familiarize old as well as new employees in this department with some of the many applications of gas as an industrial fuel.

J. H. Gumz

The course extends over a period of six weeks with one full day per week, at which time the 25 salesmen in the department are brought together for lectures and discussions on the various phases of their sales activities. The course, which has been prepared by Mr. Gumz, follows in a general way the industrial heating courses being given by several eastern universities.

There are in the gas sales department various salesmen who specialize in one or another phase of industrial installations. Accordingly, one man is assigned the position of instructor for the day in which his particular field is under discussion.

Subjects considered during the entire course will be as follows:

(1) A general session, designed to familiarize the employees with accounting procedure, merchandising, credit, advertising and warehousing as applied to the appliances or equipment that they are selling.

(2) Combustion and the composition of gases.

(3) Burners, high and low pressure mixers, proportional mixers and inspirators.

(4) Ovens, including japanning ovens, core ovens and other industrial applications of the oven heat principle.

(5) Boilers, high and low pressure, solution heating, and immersion.

(6) Heating treating furnaces.

(7) Forging soft metal alloys, temperature control.

(8) Auxiliary equipment, blowers, regulators, etc.

(9) Special applications, discussions of various concrete examples of the use of gas in industry.

The last session of the class will be devoted to talks and instruction in salesmanship. A feature of the closing meeting will be a dinner to all employees who have been attending the course.

BRAZOS RIVER GAS CO. NOW BUILDING GAS LINE

The Upham Gas interests, through a subsidiary, the Brazos River Gas Company, are constructing a gas line from the field in west Jack County, Texas, to Jacksboro. W. R. Fullerton & Company of Wichita Falls, Texas, is the contracting firm for the line, which is of four-inch pipe. Headquarters of the Upham interests are at Wichita Falls, Texas.

Instant hot water offers you—
4 to 6 hours more freedom each week
Men like the hotels and clubs because they get INSTANT hot water
Special Offer by the P. G. and E.
PACIFIC GAS AND ELECTRIC COMPANY
P·G·and E·
Owned · Operated · Managed by Californians

Why do people pay $100 to install AUTOMATIC hot water service?

Ask 20 of those who have recently purchased automatics and most of the 20 answers will be somewhat like this—

"I bought the Automatic Gas Water Heater because it gives me plenty of hot water the **instant** I want it. This convenience saves my time."

So that is the theme for a series of 10 newspaper advertisements to be run in all newspapers in the P G and E gas territory during July and August.

This type of pioneer advertising will help every one sell more Automatic Gas Water Heaters.

PACIFIC GAS AND ELECTRIC COMPANY

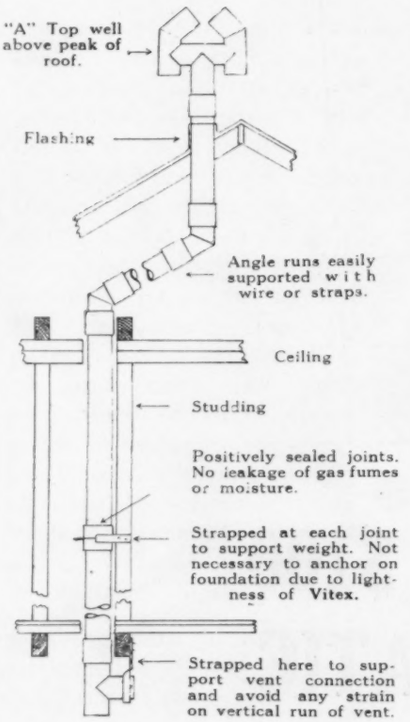
P·G·and E·

Owned · Operated · Managed
by Californians

SAN FRANCISCO 245 Market Street

VITEX The Perfect Gas Vent & Flue Pipe

Illustrating Method of Installing Vitex on Concealed Runs.


"A" Top well above peak of roof.
Flashing
Angle runs easily supported with wire or straps.
Ceiling
Studding
Positively sealed joints. No leakage of gas fumes or moisture.
Strapped at each joint to support weight. Not necessary to anchor on foundation due to lightness of Vitex.
Strapped here to support vent connection and avoid any strain on vertical run of vent.

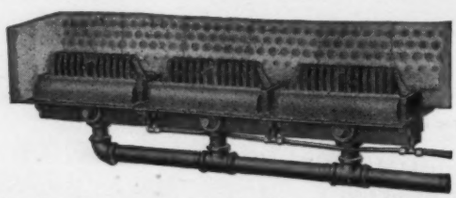
Solves the venting problem where no flue exists. Can be installed at low cost without foundation. Semi-vitrified, light in weight, absolutely non-corrosive and high in insulating value. Improves combustion by increasing draft.

Samples, prices and installation data gladly furnished on request.

PLANT
Rubber & Asbestos Works

537 Brannan Street **San Francisco, California**

R. M. C. Gas Burner



Higher Fire Box temperatures, lower stack temperatures

ROTARY MANUFACTURING CO.

5720 Long Beach Avenue **Los Angeles, California**

GAS APPLIANCE SOCIETY OF CAL. IN WATER HEATER DRIVE

Automatic water heaters are to be featured in a special drive that is to be the next objective of the Gas Appliance Society of California.

Scheduled for the months of July and August, features of the campaign include: a six-color window display poster furnished free by the society to all plumbers and dealers requesting it; publicity material to be sent out by the society to all newspapers throughout the northern part of the state; $5 down and the balance in monthly payments on all heaters up to $150 in price. As an additional special selling offer the committee has recommended that a set of Cannon towels be given free with each water heater retail sale during the two months. This set consists of one bath mat, two towels and four face cloths, which are being furnished by the leading water heater manufacturers for distribution through their regular customers. The retail value of the set is approximately $7.50.

The slogan to be utilized, and embodied in all advertising, is, "Automatic Hot Water —There's Comfort in Plenty Of It."

P. H. & F. M. ROOTS CO. ISSUES BOOKLET ON POSITIVE BLOWERS

The P. H. & F. M. Roots Company, of Connersville, Indiana, has just issued a new 16-page bulletin, Number 22-B-1 on low pressure type rotary positive blowers. The bulletin covers the new Roots modernized blowers equipped with Timken, SKF and Hyatt Bearings. A dimension print, table of sizes giving speeds, capacities and horsepowers at various pressures and a brief review of various types of pumping units are included in this new bulletin. Bulletin 22-B-1 replaces the former bulletin 1011 issued by this company, and is so constructed to make it a valuable addition to the large Roots Catalog covering pumps, meters and blowers.

PACIFIC GAS AND ELECTRIC CO. HOLDERS BEING INSTALLED

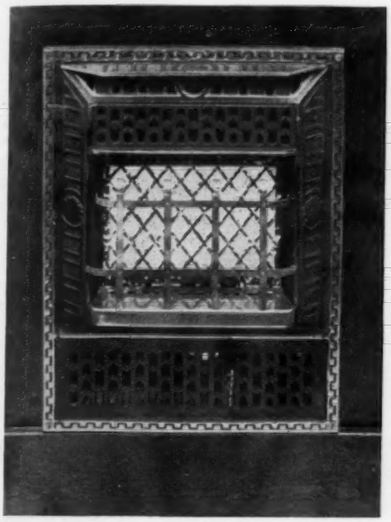
The two giant floors for the Pacific Gas and Electric Company's 10 and eight million cubic feet holders for San Francisco and Oakland, respectively, have just been lowered in position, and work is now proceeding on the side walls. The eight million feet holder floor in Oakland, weighing 340 tons, was lowered in 45 minutes without a hitch by the 200 men under the direction of the Bartlett Hayward erection crew. In placing the enormous fabricated steel disc for the 10 million feet San Francisco holder, 250 men were required and labored over two and a quarter hours at the jacks. The San Francisco holder floor weighs over 500 tons.

CONSUMERS NATURAL LINE TO BRADY, TEXAS, COMPLETE

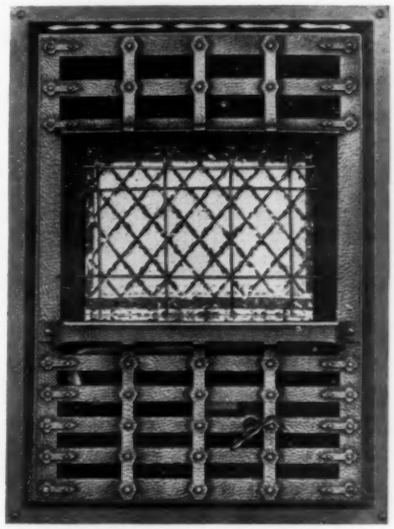
A gas line serving Brady, Texas, with natural gas was completed late in June by the Consumers Natural Gas & Power Company, a subsidiary of the Empire Public Service Company.

The line, which is 6-inches in diameter, originates in the Janellyn pool in Brown County. Brady, in McCulloch County, is approximately 30 miles distant. The line may also be tapped to serve other towns in the vicinity of Brady.

Now! Wall Heaters with A. G. A. Approval



The latest addition to the "Pacific" line of Gas Heating Equipment are the new Models 7, and 8-A Wall Heaters. These beautiful new Heaters have been thoroughly tested by the laboratory of the American Gas Association, and they now bear the "Blue Star" stamp of approval. They are equipped with the Multi-tubular burner which has proven so popular and efficient in other "Pacific" products. The attractive appearance and sturdy construction coupled with its efficiency in rendering cheerful heat will prove a quick seller and should be displayed on your sales floor.



The Multi-Tubular Burner

Each burner has its independent injection of gas. Primary air for combustion is directly siphoned at each individual burner. There is no need for adjusting of the gas and air for combustion, as this new Pacific Burner is scientifically designed to automatically give the correct proportion of air to gas. This results in complete combustion and a high temperature flame of proven economy. No soot. No odors.

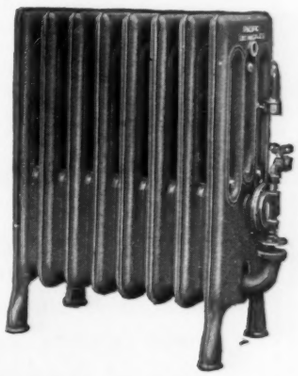
By Selling the Complete Pacific Line You Have the Advantage

Because with the complete Pacific line you can offer the correct solution to every heating problem. Where other heating salesmen stress their particular appliance, our agent selects from a full line the appliance best suited. We have a real money making proposition. Write for particulars.

A. G. A. approved Unit Furnace

The Pacific Furnace, with the recognized advantages of the "round" design, eliminates all corners and dead air spaces. It promotes better circulation, giving an abundance of heat more quickly. The heating element is completely welded throughout, is gas tight, and permits no combustion fumes to escape. The heating unit is of 20-gauge pure Ingot Iron metal.

"Pacific" Unvented Gas Steam Radiators



The Pacific Unvented Gas Steam Radiators are now available in four column pattern. A size for every demand, 26, 32, and 38 inches high. The Pacific Gas Steam Radiator has been passed and approved by both the laboratory of the American Gas Association and the Underwriters Laboratories as well.

Our agency proposition is very attractive—write for particulars concerning your locality.

Get in on Every Heating Job in Your Territory

Pacific Gas Radiator

Gas Heating Company Headquarters

Roseberry and Walter Streets, Huntington Park, California

Manufacturers of Every Type of Gas Heating Appliances

A Heater that Will Deliver a Gallon of Hot Water for Every *2 Feet of Manufactured Gas.*

THE heater is finished in lustrous enamel.

300-lb. test copper-bearing Steel tank.

New Efficient Insulating Material.

Safety Pilot.

Combination Safety and drain valve.

2 sizes: 25 gal.—40 gal.

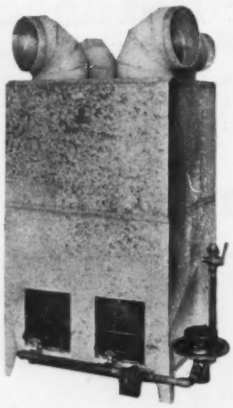
Pittsburg Monarch Automatic Storage Water Heater

Made in 2 Sizes
25 Gallons—40 Gallons

Pittsburg Water Heater Company

Offices at:

478 Sutter St. San Francisco
2010 Jackson St. Dallas
242 So. Western Ave. Los Angeles



Furnace Service

How much of your overhead is represented by unnecessary trips to your job?

In other words does your furnace or your service man render your service?

Install **Perfection Multiple Unit Furnaces** and cut down on your overhead.

TESTING LABORATORY AGA APPROVED

L. H. Freymuth Jr

311 East Pico St., Los Angeles

May we mail you a copy of "Radiant Heat for Health"? In it is explained clearly, tersely but with scientific exactness the new discovery that the rays of radiant heat contain invisible infa-red (so-called "sunlight") rays of tremendous therapeutic value. We sincerely believe that this information when properly disseminated will open a new and profitable avenue of sales appeal to the entire Gas Industry.

C. B. BABCOCK CO.

San Francisco Los Angeles

SO. CAL. GAS CO. OUTLINES PLAN FOR "NATURAL" IN SAN JOAQUIN

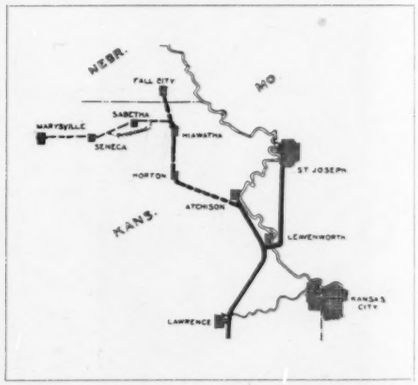
A DETAILED plan to supply natural gas in its San Joaquin Valley Division was submitted to the California Railroad Commission on Thursday, June 13, by the Southern California Gas Company. This project will give 100 per cent natural gas service before winter to the cities of Parlier, Reedley, Dinuba, Kingsburg, Lemoore, Armona, Hanford, Visalia, Farmersville, Exeter, Tulare, Lindsay, Strathmore, and Porterville. It is also contemplated to deliver natural gas to Madera and possibly to Turlock, both now being supplied with manufactured gas by affiliated companies. It is also possible that the gas will be sold wholesale to the cities of Merced and Selma.

The Southern California Gas Company has entered into a 20-year contract with the Standard Oil Company of California for a supply of natural gas from the new Kettleman Hills gas and oil field. It is planned to pipe the gas from this field, which lies 17 miles southeast of Coalinga, using 27 miles of 10-inch main, 50 miles of eight-inch, and 72 miles of six-inch, in addition to other smaller mains. This is expected to cost in the aggregate approximately $1,350,000.

Part of the necessary pipe is already on hand, and work on some of the connecting lines will be started immediately, including some of the lines in the vicinity of Visalia and Hanford.

LINE FROM ATCHISON, KANSAS, TO FALLS CITY, NEB., IN PROJECT

THE Gas Service Company will extend its natural gas pipeline to cities in northeastern Kansas, and into Nebraska as far as Falls City, the line and its branches to serve about ten communities. The projected development would extend



from Atchison, Kansas, northwest to Horton, then north to Hiawatha, Kansas, and Falls City, Nebraska, a distance of approximately 50 miles, with an added branch line to Marysville, Seneca and Sabetha, Kansas. Surveyors are now in the field, and franchises are being sought in the territory.

CUSTOMER OWNERSHIP CAMPAIGN GOES OVER THE TOP

A total of 18,618 shares of stock were sold by the Gas Service Company in a recent Customer Ownership campaign, exceeding by 2,500 the largest previous sale of November, 1926, when 16,145 shares were sold.

The Capital Gas Company of Topeka, Kansas, took first place in percentage of sales, with the Kansas City Gas Company taking second honors.

The Door to Service

In the purchase or specification of automatic controls there is a definite consideration beyond the service that the goods themselves provide---the service which is rendered by the control manufacturer.

That service, with us, begins before there is an actual purchase. Engineering help is available for the solution of your control problems---and that service continues with a national distribution system to give you prompt delivery. Furthermore adequate personal contact gives you the advantage of our control experience at all times.

We appreciate the necessity for service ---prompt, efficient and thorough-going in every particular. Our door is truly the door to service, before, during, and after the purchase of Time-O-Stat products.

TIME-O-STAT CONTROLS COMPANY

ELKHART, INDIANA

Successor to

Time-O-Stat Corporation
Absolute Con-Tac-Tor Corporation
Leachwood Company
Cramblet Engineering Corporation

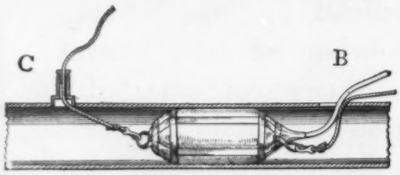
Manufacturers of AUTOMATIC CONTROLS *for*

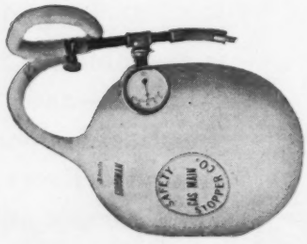
Oil Burners - Gas Burners - Electric Refrigerators - Mechanical Stokers - Furnace Fans
Industrial Ovens - Ice Machines - Unit Heaters - Water Heaters - *Also* Sign Flashers
Mercury Switches - Electric Heaters - Corrugated Metal Bellows

Pipe Stoppers

2" TO 48"

Goodman Cylindrical Stopper





For Any Pipe—
Intermediate Pressures

DEPENDABLE GAS MAIN BAGS—THREE TYPES

Type A—Seamless, reinforced tube. **N**

Type B—Reinforced seams, for heavy duty.

Type C—Canvas-covered, for use where plain rubber will not last. TREATED FOR USE IN OIL LINES while welding is being done.

Safety Gas Main Stopper Company

523 Atlantic Avenue, Brooklyn, N. Y.

Cable Address: Gastopper, N. Y.

Pacific Coast Representative: C. B. Babcock Co., San Francisco, California

For Reliability—*Specify*

Ingersoll-Rand

GAS INDUSTRY

Pneumatic Equipment

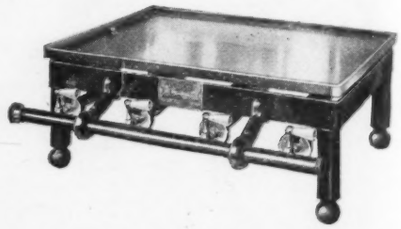
INGERSOLL-RAND COMPANY

NEW YORK CITY · LOS ANGELES · SAN FRANCISCO
SEATTLE · EL PASO · DALLAS · DENVER · MEXICO CITY
TULSA · ST. LOUIS · PITTSBURGH · BIRMINGHAM · BUTTE
SALT LAKE CITY · NEW ORLEANS

Offices in principal cities the world over

NEW RAISED EDGE GRIDDLE PLACED ON MARKET

A new type of raised edge, gas-fired, griddle adapted for frying steaks, hamburger, sausages, cakes, etc., has been placed on the market by the Standard Gas Equip-



ment Company. A desired grease level may be maintained by means of a hollow screw plug. Greese can be drawn off by the removal of the plug, into a pipe through a threaded connection. A gasket between raised edge and plate is designed to prevent leakage of grease.

W. B. WAY TAKES UP RESIDENCE IN TULSA, OKLA.

W. B. Way, newly elected general manager of the International Petroleum Exposition, has moved his place of residence to Tulsa, Oklahoma, where he now has preparations well under way for the Exposition convening in Tulsa, October 5 to 12. Offices have been established by Mr. Way at 124 West Third St.

Exhibitors who have taken space for the duration of the Exposition numbered 80 on June 12, with reservations steadily increasing. Complete exhibits in electrical welding, pipe welding and pipe protection will have a prominent place.

FRANCHISE AT TURKEY, TEXAS, GIVEN TO AMARILLO CO.

Turkey, Texas, has granted franchise rights to the West Texas Gas Company, of Amarillo, Texas, and will be supplied with gas through a line tapping the main line of the company south of Tulia. Gas is expected to be turned into the city mains around October 1. Actual construction of the line began in June.

The main line of the West Texas Company extends south from the Amarillo fields, serving Canyon, Tulia, Plainview, Lubbock and other towns.

CANADIAN GOVERNMENT TO STUDY GAS CONSERVATION

Both Federal and Provincial governments have appointed representatives on a commission to inquire into the problem of waste gas in the province of Alberta, the chief oil area of Canada. The opening up of new markets as a field for marketing natural gas for industrial power, and the alternative of exporting natural gas to the United States until such time as Canada can find a market within her boundaries for the steadily-growing supply, will be but two of the questions to be dealt with.

SO. COUNTIES GAS CO. OPENS BALDWIN PARK OFFICE

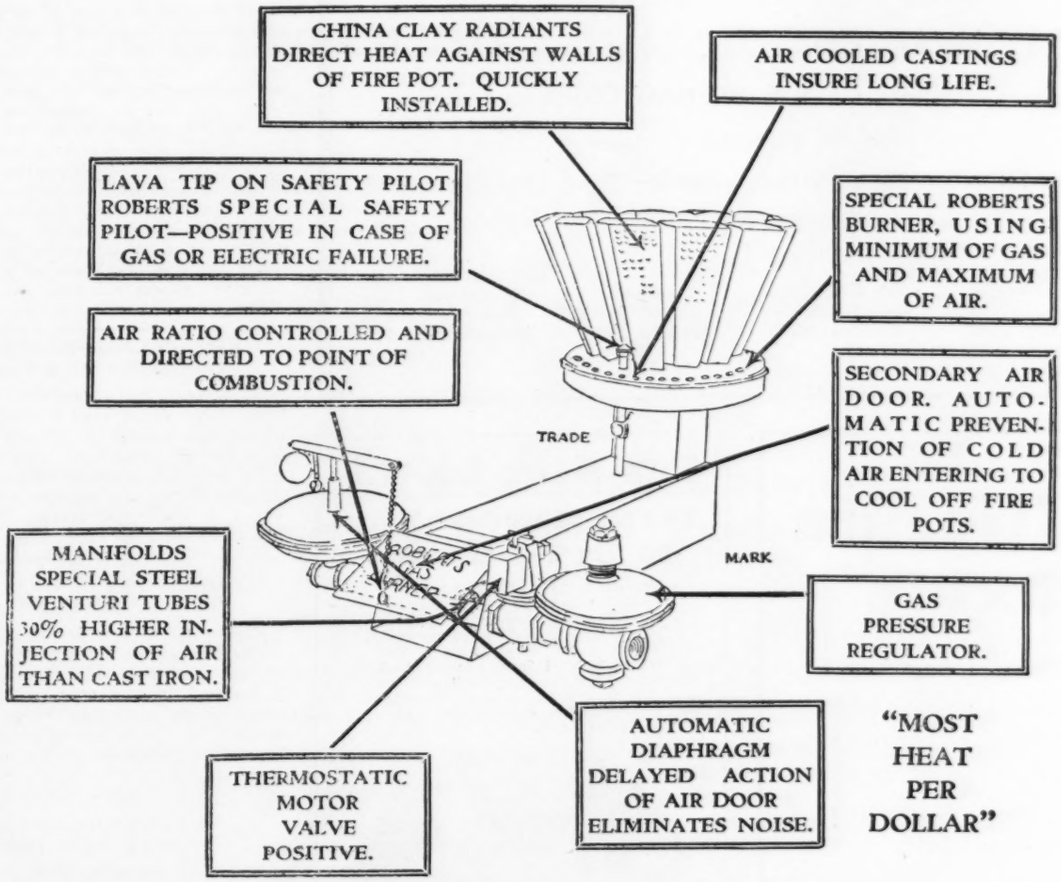
Southern Counties Gas Company, with headquarters in Los Angeles, California, announces the opening of another branch office for the Pomona district of the company. The new branch is in Baldwin Park, where a full line of modern gas merchandise will be carried for sales in that territory.

10 REASONS WHY

The Roberts Controlled Gas Heating Unit

IS NOT . . .

Just another gas Burner . . . . . .


CHINA CLAY RADIANTS DIRECT HEAT AGAINST WALLS OF FIRE POT. QUICKLY INSTALLED.
AIR COOLED CASTINGS INSURE LONG LIFE.
LAVA TIP ON SAFETY PILOT ROBERTS SPECIAL SAFETY PILOT—POSITIVE IN CASE OF GAS OR ELECTRIC FAILURE.
SPECIAL ROBERTS BURNER, USING MINIMUM OF GAS AND MAXIMUM OF AIR.
AIR RATIO CONTROLLED AND DIRECTED TO POINT OF COMBUSTION.
SECONDARY AIR DOOR. AUTOMATIC PREVENTION OF COLD AIR ENTERING TO COOL OFF FIRE POTS.
TRADE
MARK
MANIFOLDS SPECIAL STEEL VENTURI TUBES 30% HIGHER INJECTION OF AIR THAN CAST IRON.
GAS PRESSURE REGULATOR.
AUTOMATIC DIAPHRAGM DELAYED ACTION OF AIR DOOR ELIMINATES NOISE.
THERMOSTATIC MOTOR VALVE POSITIVE.
"MOST HEAT PER DOLLAR"

For Hot Water, Steam, Vapor and Warm Air. Made in all sizes and to fit all shapes of furnaces.

Write us today for more detailed descriptions and prices.

Roberts-Gordon Appliance Corporation

Successor to Roberts Gas Burner Corporation

Curtiss Building, Delaware Ave., at Tupper St., Buffalo, N. Y.

Gladding, McBean & Co.

FIRE BRICK

For Gas Generator

Checkers, Linings and Boiler Settings

We Are Manufacturers of a Full Line of
HIGH GRADE REFRACTORIES
For All Industrial Purposes
Also Fire Clay Chimney Pipe, Chimney Tops, Flue Linings, Gas Flues, Etc.

Los Angeles 621 So. Hope St. TRinity 5761
San Francisco 445 Ninth St. Douglas 0540
Oakland 22nd and Market Oakland 0262
Fresno (San Joaquin Materials Co.)

California Oxide

GAS Purification Requirements can be most efficiently cared for through the additional and improved facilities of our new plant in Southgate.

Both Maas and McKee Oxides have met gas purification requirements of the Pacific Coast over a period of several years and merit your investigation.

California Oxide Co.
308 East Eighth Street
Los Angeles
TRinity 0769

THE BABY DIGGER

The Ideal Modern Way To Dig Gas Trench!

Cleveland Baby Diggers are unequalled for downright usability and trenching satisfaction. Compact — transportable — economical. Tough — fast — dependable. Precision built of finest materials. A wheel type trencher on full crawlers. You'll find Cleveland Trencher pioneering the features that count. Write for particulars.

THE CLEVELAND TRENCHER COMPANY
"Pioneers of the Small Trencher"
20100 St. Clair Ave.
Cleveland, Ohio, U. S. A.
Edward R. Bacon Co., 17th at Folsom Sts.
San Francisco, Cal., Distributor

ADVERTISING ASS'N. NAMES GAS REPRESENTATIVES TO OFFICE

At the recent annual convention of the Public Utilities Advertising Association, held in Chicago, Illinois, R. E. Haas of the Columbia Gas and Electric Corporation of New York, was elected secretary, and H. F. Weeks, editor of the American Gas Association's monthly publication, was elected treasurer.

The following new directors were also elected at the Chicago meeting representing gas interests:

J. C. Barnes of the New Orleans Public Service, Inc., New Orleans, Louisiana; Henry Obermeyer of the Consolidated Gas Co. of New York; and Keith Clevenger, director of advertising and publicity for the American Gas Assocation, New York.

L. A. GAS AND ELECTRIC BEGINS SALE OF RADIANTS AND TUBING

Los Angeles Gas and Electric Corporation announced in June that it will begin the sale of gas tubing and radiants for radiant-type heaters. The company through its continuous appliance survey has seen the need for taking this step to replace improper tubing and supply radiants to the consumers where heaters are now operating with broken or missing radiants. The activity is being carried on under the new business department of which Frank Weiss is manager. Orders for the tubing and radiants will be taken by collectors and other employees making consumer contacts, and general publicity is being given the new service over the utility's system.

LUFKIN, TEXAS, FRANCHISE GIVEN TO DIXIE GAS & FUEL CO.

A 25-year gas franchise was recently granted the Dixie Gas & Fuel Company at Lufkin, Texas, which is only a few miles removed from the Dixie Gulf Gas Company line from Waskom to Houston. It will tap this line at the nearest point. Humble, Texas, is also to be served from the Waskom-Houston and Port Arthur line.

COLUMBUS, TEXAS, GRANTS PERMIT TO SOUTHWEST GAS CO.

Columbus, Texas, according to press reports, has granted a natural gas franchise to the Southwest Gas Company, a Belchic & Laskey, Inc., interest. The company is planning on extending its gas mains to a number of Texas towns, among them Halletsville, Schulenburg, La Grande and Smithville.

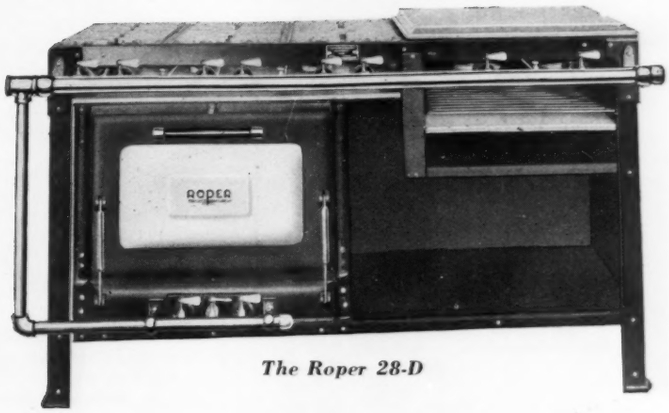
SO. COUNTIES GAS CO. TO SERVE NEW TOWNS

Southern Counties Gas Company, with headquarters in Los Angeles, California, will complete a line to serve Dana Point, Serra, San Clemente and San Juan Capistrano, California, with gas due sometime in September. There will be 70,000 feet of 6-inch pipe and 30,000 feet of 4-inch, beginning at Laguna and extending southerly along the coast. Sale of gas appliances is making rapid headway in the territory.

UTAH FOUND TO BE HELIUM PRODUCING CENTER

The discovery of helium gas in large quantities in Utah is reported. The gas is said to have a 7.07 per cent helium content as compared with a 1.75 per cent helium content in gas produced in the Texas fields, where the navy now gets its supply. The discovery was made by a naval reserve officer, Lieutenant R. R. Bottoms.

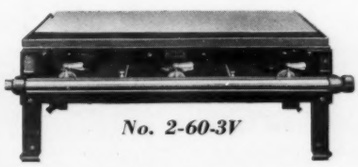
Bring Along A Friend.



The Roper 28-D

Let one good range introduce another

You have already sold the 28-D. The Chef wanted a good substantial short order range, built to stand both use and abuse in his hurry-up kitchen demands. The three section open top with three giant burners and three regular burners —the two section griddle top—the toaster and broiler—and the sturdy oven will fill the bill here.



No. 2-60-3V

But don't forget the restaurant window. No. 2-60-3V of the Roper line, a Short Order and Window Range, is a good companion to the larger range.

It is finished in black baked on enamel. Can be equipped with open top grates if desired. Is most popular with cafe owners as a smooth top cake griddle. And installed in the window where all who pass may see it in operation—it is a real business getter.

Being a Roper product, it goes without saying that it is economical in operation.

ROPER

TRADE MARK REG. U.S. PAT. OFF. REG. IN CANADA

GAS RANGES
GAS FURNACES

Geo. D. Roper Corp., Rockford, Ill.

C. B. BABCOCK CO.
135 Bluxome St. San Francisco

GAS or WATER Connections

whether screw thread or gasket, should be made up with KEY TITE PIPE JOINT COMPOUND.

KEY TITE PIPE JOINT COMPOUND is not a quick hardening cement, but a plastic lubricant and a filler that will seal the most obstinate joint with ease. It covers more surface than an equal volume of red or white lead, thereby reducing the cost. It is waterproof—and there is no waste.

Manufactured by

E. A. Key Co., Inc.

1431 Santa Fe Ave.
Los Angeles, Calif.

Distributors in all principal cities.

WRITE FOR FREE SAMPLE

STANLEY KERR NAMED MANAGER OF NEW BUSINESS FOR DALLAS CO.

Stanley E. Kerr has been appointed manager of the New Business Department of the Community Natural Gas Company, subsidiary of the Lone Star Gas Company, of Dallas, Texas.

Mr. Kerr, who succeeds G. L. Armstrong in this position, has for the past two and one-half years been associated with the Industrial Department of the Lone Star Gas Company, recently having supervision of this work with the company for the southern division of its system. Prior to this he had charge of the Terril division and more recently the Temple division.

Mr. Kerr is a native Texan. His early technical training began in Boston, where he attended school following graduation at Corsicana, Texas.

The Community is the distributing unit of the Lone Star Gas Company in more than 200 cities and towns in Texas and Oklahoma. Merchandising of gas appliances was begun by the company more than a year ago. Chester L. May is superintendent of the Community. C. L. Trevitt is assistant manager of the New Business Department.

ARKANSAS NATURAL GAS CO. BUYS INDUSTRIAL GAS CO. PROPERTY

The natural gas franchise in El Dorado, Arkansas, together with the properties of the Industrial Gas Company, have been purchased by the Arkansas Natural Gas Company. Offices of the Industrial Gas Company and the Public Utilities Corporation have been consolidated, the latter company also being a subsidiary of the Arkansas Natural. The new company at El Dorado is under the direction of R. L. Stacey.

McGEHOE AND KENSETT, ARK., TO HAVE NATURAL GAS

A franchise for the service of natural gas to McGehoe, Arkansas, has been granted to the Arkansas Power and Light Company. Construction is expected to begin immediately on the line, which will be a branch of the Mississippi River Fuel Corporation's line to Memphis. Kensett, Arkansas, has also granted a franchise to the same company, and will be served from the Mississippi River Fuel Corporation's line.

CONRAD AND CHOTEAU, MONT., TO HAVE NATURAL SERVICE

A natural gas pipeline from northern Montana fields to serve Conrad and Choteau, Montana, will be completed by October 1, according to a statement released by E. J. Hubbard of Great Falls, representing the Pondera Valley Utility Company. Mr. Hubbard's company has taken over the natural gas franchises in Conrad and Choteau.

MURRAY CITY, UTAH, TO HAVE GAS FROM BAXTER BASIN

Murray City, Utah, will receive natural gas from the Baxter Basin-Salt Lake City line now in process of construction. The Wasatch Gas Company, distributing the gas, has leased offices in the Caldwell Building.

HAYS, KANSAS, GRANTS PERMIT TO CENTRAL KANSAS GAS CO.

The city commissioners of Hays, Kansas, on June 25 granted the Central Kansas Gas Company a franchise for the service of natural gas to that town.

UNITED GAS CO. WILL BUILD LINE TO MONTERREY, MEXICO

United Gas Company, under Moody-Seagraves management, has definitely announced plans for the natural gas line from Zapata County, Texas, to Monterrey, Mexico, and has formed the Cia. Mexicana de Gas S.A., under the laws of Mexico as an operating subsidiary in that country.

The Cia. Mexicana de Gas S. A. has been organized as the transporting company and will sell gas to the local distributing company in Monterrey. It has also signed a number of contracts for industrial gas in the vicinity of that city.

The line will originate in the Jennings field in Zapata County, and will cross the Rio Grande River at Roma, Texas, extending from that point in a direct line to Monterrey, which is said to be the greatest industrial center in northern Mexico.

Delivery of pipe was expected to begin the latter part of June and immediate construction to follow. Smith Brothers Construction Company of Dallas, Texas, have the contract for the line, which is to be 12¾ inches in diameter.

Insulated Oven Range Is Added *to* Roper Line

A LATE addition to the Roper line of gas ranges is the Roper insulated oven range. Insulating material used is, according to the manufacturer, fire-proof, and chemically stable.

In addition to its insulated construction, this new range has the Roper ventilated

oven, the Roper oven control; the new "Self-Slide" broiler and "Super-Broiler" pan; the "Touch-a-button" top lighter; "Rust-Proof" porcelain enamel oven linings; and a utility drawer.

Roper insulated oven ranges may be had in the all-white finish, full gray and white finish, three-quarter white finish or the three-quarter gray and white finish.

LONE STAR GAS CO. METERMEN IN SPRING SESSION

The three-day spring meeting of the metermen of the Lone Star Gas Company was held at the company's headquarters in Dallas, Texas, early in June. Forty-four meter and regulator inspectors from the company's system in Texas and Oklahoma attended. D. A. Sillers, superintendent of gas measurement for the Lone Star Gas Company was in charge of the sessions.

On 4 floors in this large building Clow Gasteam Radiators cut heating costs

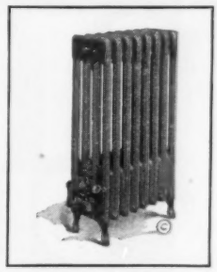
Clow Gasteam Radiators are providing trouble-free steam heat in the Mississippi Warrior Service offices, occupying four floors in the Godchaux Building, New Orleans.

Each floor covers 1200 square feet . . with 11-foot ceilings. Forty-eight Clow Gasteam Radiators handle the job.

Clow Gasteam Radiators mean real steam heat on quick notice. They eliminate the need for basement, furnace man and costly fuel storage space. The exclusive, lap-jointed construction of the Clow combustion chamber insures a perfect draft and complete freedom from fire hazard.

On every type of installation, from the smallest room to the largest building, Clow Gasteam Radiators are giving perfect service. Write today for free new book giving a simplified B. T. U. method of calculating steam radiation.

Godchaux Building, New Orleans
Favrot & Livaudais, Architects



JAMES B. CLOW & SONS 201-299 North Talman Avenue, Chicago

CLOW A.G.A. Approved. Listed and Inspected by Underwriters' Laboratories GASTEAM

STOCKED IN EVERY SECTION OF THE COUNTRY

Stockton Fire Brick Company

FIRE BRICK, INSULATING BRICK
HIGH TEMPERATURE CEMENT

High Grade Refractories
for

GENERATOR LININGS
CHECKERS
BOILER SETTINGS

OFFICE:
Russ Building,
San Francisco

WORKS:
Stockton,
California

The STRICKLER
Ratchet Pipe Cutter

The STRICKLER Ratchet Pipe Cutter automatically cuts cast iron, steel and wrought iron pipe (from 1½ to 30" in diameter) by hand (either in the trench or in the shop).

You can cut any pipe from any position easily. Simply pump the handle and the STRICKLER does the rest. Order your STRICKLER Now

W. W. STRICKLER & BROS.
1475 Oak Street Columbus, Ohio

SOUTH CHESTER STEEL PIPE

Excels for Gas Service

The unusual care given to accuracy of diameter and welding qualities, makes Chester Pipe a favorite for gas lines.

SOUTH CHESTER TUBE CO.
Chester, Pa.

Northwest Conference

(*Continued from Page 35*)

active in furthering the sale of appliances both on their own floor and by dealers, and that in addition they guard jealously the character of appliances connected to their lines.

Public Relations

The discussion under the title "Our Public Relations" by Geo. L. Myers, Portland Gas & Coke Company, which appears on another page of this issue, is an extremely able presentation of this elusive subject which involves so many subtle factors and so many unknown qualities. Mr. Myers is vice-chairman of the Public Relations Section.

Credit and Collection Policies

This was a preliminary report of the Committee on Customers' Records and was presented by J. E. Manheim acting for F. L. Nagel, the committee chairman. In it were discussed cash deposits, discounts on service bills and the presentation and collection of bills by collector. A deposit policy is advocated which permits the applicant for service to establish his credit as he would with any mercantile house, deposits being required only from those whose record is not satisfactory.

The committee does not believe that the cash discount for prompt payment is of value but usually operates to delay payment until the last discount day. The discount may also breed complaint, as the customer who loses his discount in many instances feels that the company is unduly profiting at his expense.

The presentation of bills by collectors is considered from a public relations viewpoint with the conclusion that the adverse effects outweigh the advantages.

The New Water Gas Plant in Vancouver

The Saturday morning session was opened by John Keillor with a technical description of Vancouver's new automatic water gas plant. Mr. Keillor's paper appeared in *Western Gas* for June. Many of those in attendance at the meeting, later went to Vancouver to see this plant and were very favorably impressed by its compactness, cleanliness and economy.

Refrigeration

John Fremont, chairman of the Refrigeration Committee, presented a report on the present status of gas refrigeration. The committee communicated with all companies selling refrigeration and after a study of the data supplied has reached the conclusion that gas refrigeration is an established thing and

can be sold with absolute confidence. The monthly gas consumption will vary between 750,000 and 1,000,000 B.t.u., with an average of 850,000 B.t.u. The cooling water varies between 1,500 and 3,000 gallons per month. It is usual to install refrigerators without a vent. Cost of installation is reported as running from $10 to $37, with a tendency to decrease as workmen become more expert. No representative figure could be established for service calls. With many companies, refrigeration is still in the pioneer stage and regular bi-monthly or monthly inspections are made. Two companies report two service calls per year.

Industrial Sales

The discussion on Industrial Sales was in the nature of a symposium on what gas fuel is doing for industry. Messrs. C. R. Miller, Portland Gas and Coke Company; S. R. Hutchinson, Seattle Lighting Company; R. W. Coblentz, Washington Gas and Electric Company; Robt. Carver and J. A. Thomson, British Columbia Electric Power and Gas Company, contributed to it. Several interesting applications of gas fuel were described and will be made a part of the Industrial Sales Committee report to be presented at the convention in September.

REGISTRATION AT VICTORIA CONFERENCE

Victoria, B. C.: A. T. Goward, S. Gurney, S. J. Halls, F. H. Hewlings, H. Inglis, A. Inglis, P. H. Leacy, D. S. Mowat, I. R. Myers, W. G. Roach, H. Sabiston, E. Taylor, W. B. Wellwood.

Vancouver, B. C.: Fred T. Arnott, John Dewar, W. H. Dreaper, H. S. Cheetham, J. P. Fergusson, J. Fremont, John Keillor, E. E. King, J. Lightbody, F. H. Normington, F. Normington, Andrew Ogilvie, F. E. Reed, Ernest Rogers, W. C. Soresby, I. A. Thomson.

Portland, Ore: S. A. Beck, Mr. and Mrs. Lewis H. Calhoun, R. W. Cobb, R. J. Disher, L. Duncan, W. M. Duggan, Ray C. Finch, John H. Hartog, Cal Harris, C. R. Johnson, J. Earl Jones, W. M. Kapus, Duass S. Kellaway, J. E. Mannheim, J. F. McIndoe, C. R. Miller, Geo. L. Myers, B. H. Parkinson, H. H. Stewart.

San Francisco, Calif.: T. G. Arrowsmith, Wm. D. Dickey, E. J. Hinchey, W. L. Hoyt, Clifford Johnstone, F. C. Packer, B. S. Pedersen, K. C. Tomlinson, Mr. and Mrs. R. Tiernan.

Seattle, Wash.: W. B. Addy, A. B. Daab, Norbert O. Pratt, Lewis A. Hubbs, S. R. Hutchinson, A. A. Knoernschild, D. O. Oldham, G. M. Stowe, Jr.; P. Widholm.

Tacoma, Wash.: R. W. Coblentz, A. C. Goble, F. C. Hawks.

Los Angeles, Calif.: F. H. Bivens, E. H. Roseberry.

Aberdeen, Wash.: D. C. Alexander, M. C. Hancock.

Olympia, Wash.: L. P. Crispin.
Minneapolis, Minn.: F. C. Mays.
Bellingham, Wash.: Jas J. Ferrari.
Medford, Ore.: K. I. Dazey.
Denver, Colo.: Roy G. Munroe.
Everett, Wash.: C. E. Lasher.
Centralia, Wash.: Fred W. Schwab.
Eugene, Ore.: F. W. Olsen.
New Westminster: B. C., J. Friend.

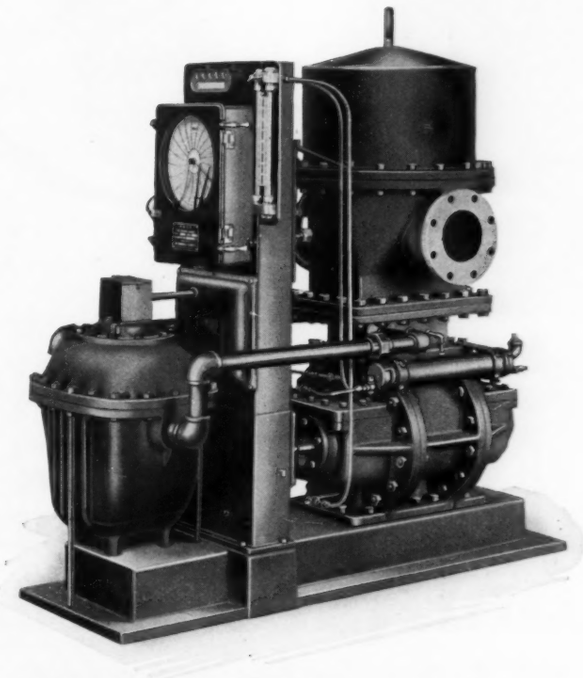
Cooperative Advertising

(*Continued from Page 35*)

sage to operators in these several fields. The advertisements will be prepared with special reference to the interests of each class of industry. In other words, it is not the intention to prepare

Modern **Connersville** Equipment

increases gas distributing efficiencies



How much gas are you Losing at peak loads?

One of the problems of the gas industry has been the accurate measurement of gas that is consumed in a varying volume—on distribution lines—at "city gates" on large consumer installations.

The Connersville Tandem Meter meets this requirement by handling loads ranging from zero to 200 per cent of the normal rating of the standard Connersville Meter that is used. In this unit—for it is a unit, operating entirely automatically and having only one inlet and one outlet opening to be connected into the gas line—you have that characteristic of Connersville Meters which assure dependably accurate measurement of gas flow at the peak load conditions—the time when the greater volume of gas is being consumed.

The Connersville Tandem Meter is another of the developments in gas handling equipment which this company has made for the gas industry. May we send you more detailed information?

The Connersville Blower Company

Michigan Ave. at 16th St.
Connersville, Indiana

CONNERSVILLE

Blowers-Gas Pumps-Meters-Cycloidal Pumps

ORIFICE FITTING

..the ONLY *Patented
ORIFICE FITTING

ROBINSON of course

*U. S. Patent No. 1569305

ROBINSON ORIFICE FITTING CO.

1435 SANTA FE AVENUE, LOS ANGELES, CALIF.

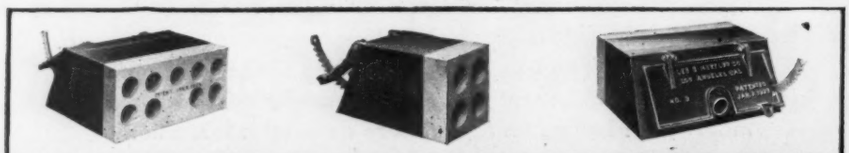
Distributors

The Foxboro Company . . Westcott & Greis, Inc.

English Distributor

Walker, Crosweller and Company
54-58 Queen Elizabeth Street, London, S. E. 1

ROBINSON
ORIFICE FITTING



Mettler Entrained Combustion Gas Burners
FOR ALL Purposes
Kinds of gas
Pressures

406 S. Main St. LEE B. METTLER. CO. Los Angeles Cal.

one advertisement of a general nature and make it do for all the different industries to be contacted. The trade journal advertising will cover a period of six months.

The advertising agency is preparing a portfolio which will set forth the whole advertising program in complete detail, and thus furnish the information which will enable sales and advertising executives to take the fullest advantage of the co-operative effect. Sufficient copies of the portfolio will be made so that the industry at large on the Coast will be minutely informed as to subjects, schedules, and available advertising helps.

PECOS VALLEY GAS CO. ISSUES 1ST MORTGAGE SINKING FUND

A first mortgage sinking fund of $475,000 in 6½% bonds with stock purchase warrants has been issued by the Pecos Valley Gas Company of Artesia, New Mexico, through its trustee, the Mercantile Securities Corporation, the investment division of the Mercantile Bank & Trust Company of Texas, at Dallas. The issue is dated May 1, 1927, and falls due November 1, 1937.

The Pecos Valley Gas Company now has under construction 41 miles of 8-inch line from the Artesia, New Mexico, field to Roswell, as well as a 25-mile supply line to gas wells in western Eddy County, New Mexico.

Gas is expected to be turned into Roswell mains around July 15, where it will be supplied at wholesale to the Southwestern Public Service Company for distribution. Enroute to Roswell the line will serve Lake Arthur, Hagerman and Dexter, at which places the Pecos Valley interests own the local distributing systems. The Pecos Valley Gas Company also supplies gas to Carlsbad. Their total system approximates 125 miles of transmission mains.

LONE STAR GAS CO. ENTERTAINS VISITING ROTARIANS

Lone Star Gas Company was host to an informal meeting of gas men attending the International Convention of Rotary, recently in session in Dallas, Texas. The meeting was held in the club rooms of the company and was attended by gas men from widely located points in the United States and Mexico.

R. G. Soper, vice-president and secretary of the Dallas Gas Company, was in charge of the meeting with A. J. Gonnoud, president and general manager of the Kings County Lighting Company of Brooklyn, N. Y., acted as chairman.

H. A. GUMP OF DALLAS, TEXAS, KILLED IN ACCIDENT

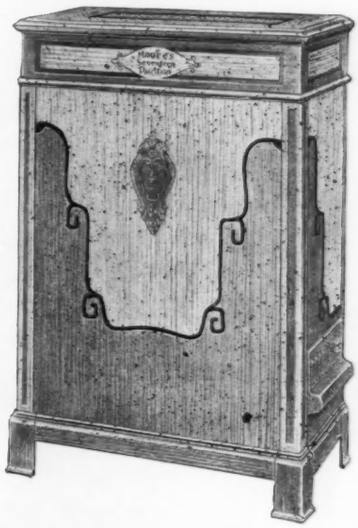
Harry A. Gump, vice-president of the Oklahoma Contracting Company of Dallas, Texas, and his wife, were instantly killed in an automobile accident occuring near Durant, Oklahoma, on June 10.

Mr. Gump was at one time associated with the Oklahoma Natural Gas Corporation of Tulsa. His contracting company are sub-contractors on the Louisiana-St. Louis Line and also on the Louisiana to Atlanta gas line, both of which are now under construction.

MOORE'S *Seventeen* PURITAN

The Heater That Speaks for Itself

Meets Every Heating Requirement



THREE SIZES

Normal input ratings:

105,000 B.T.U.'s per hour.
70,000 B.T.U.'s per hour.
35,000 B.T.U.'s per hour.

THREE FINISHES

Two-Tone Walnut and Mahogany porcelain enamel.
Velvo-Black.

It takes more than a flame and a casing to make a successful circulating gas fired heater.

MOORE BROTHERS COMPANY, Joliet, Illinois

Since 1857

MAIL COUPON

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Gentlemen:

We are interested to know more of MOORE'S *Seventeen* PURITAN Heater.

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Firm.....

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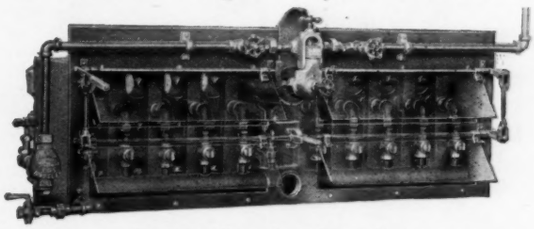
The Leahy Multi-Jet Unit

Is an investment in fuel saving that you cannot afford to overlook



Patents allowed and pending
View showing Combination Gas and Oil Unit

Designed for Front, Rear and Vertical Firing, Burning Efficiently Low or High Pressure Natural or Manufactured Gas.

Exclusive features that have created exceptional demand for this unit:

1—Designed with no draft loss.
2—High overloads on low gas pressures with minimum draft.
3—Each individual burner receives correct air and gas mixture for maximum efficiency.
4—Auxiliary air opening around tile increases overload capacity of unit with no sacrifice in efficiency.
5—Correct amount of air for combustion can be obtained with minimum opening in stack damper, which retains heat in boiler instead of letting it escape up the stack.
6—Does not require high gas velocities through burner in order to draw sufficient air for combustion.
7—All primary and auxiliary air is admitted through unit and evenly distributed to each burner.
8—Equal distribution of heat full width of firebox.
9—All parts individual and removable.
10—The oil burner can be inserted in the unit or removed instantly.
11—Equal efficiency on gas or oil.

An Efficient, Indestructible, Portable Unit with a Low Initial and Upkeep Cost.

Request literature, data, and installation prints on our

Oil and Gas Burning Equipment

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Established 1902

Sprague Semi-Chrome Leather

Resists Acids
and Boiling Water

Now Used in All

Sprague Meters and Regulators

After

Five Years' Tests and Experiments

May we send you samples and data

The Sprague Meter Co.

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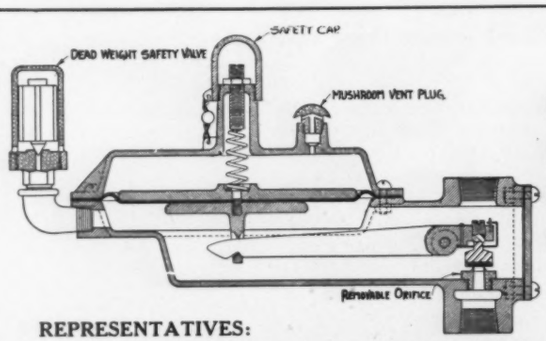


PRESSURE REGULATION FOR ALL REQUIREMENTS

REPRESENTATIVES:

Seidenglanz & Co., Santa Fe Building, Dallas.
Midland Supply Co., Dwight Building, Kansas City.

GROBLE GAS REGULATOR COMPANY, Anderson, Ind.

KANSAS PIPE LINE & GAS CO. TO BUILD NEW GAS LINE

The Kansas Pipe Line and Gas Company of Salina, Kansas, affiliated with McPherson Oil and Gas Development Company, and a subsidiary of the Studebaker interests of Chicago, has applied to the public service commission of Kansas for permission to operate in 11 additional counties in the state, including Barber, Kingman, Harvey, Morris, Marshall, Washington, Republic, Cloud, Nemaha, Brown and Jackson.

The company proposes to construct a gas line from fields southwest of Medicine Lodge, in Barber County, Kansas, across Kingman, Reno, Harvey and McPherson counties to a point near the city of McPherson. From this point the line will extend across Marion, Dickinson, Morris, Geary, Riley and Marshall counties. Branch lines will extend from a point near Marysville westward across Washington County to Republic and Cloud counties and east from a point near Marysville to Nemaha, Brown and Jackson counties.

The line will extend northeast from Medicine Lodge, to a point northeast of Junction City in Geary County, and then north to Maryville in Marshall County. From there the line will extend east to Hiawatha. It will also extend west from Maryville to Bellville in Republic County.

Twenty-two miles of eight-inch gas line was recently put into operation by the company, according to report, extending from the gas area four miles north of Halstead, Kansas, to a point five miles northeast of Hutchinson, where it joined another line of the company. Two hundred miles of gas main is maintained by the company between Hutchinson and Manhattan in central Kansas. Ernie Duree is general manager of the company.

WESTERN GAS COMPANY'S LINE WILL SERVE SCORE OF TOWNS

Thirteen towns in central Kansas have already been connected to the gas line system under construction by the Western Gas Company of Salina, Kansas. Twice that number are expected to be connected to the system when it is completed.

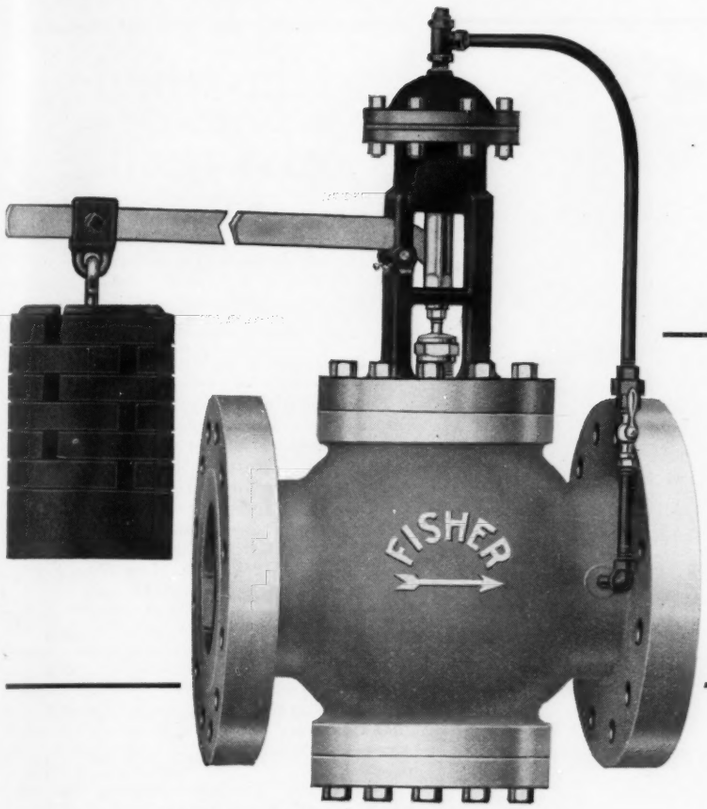
More than 100 miles of 6-inch main have already been laid from the gas well north of Bison in Rush County north to the towns or Loreta, Pfeifer, Victoria, Walker, Gorham, thence west to LaCrosse, east and south to Otis, Olmitz, Hoisington, Ellinwood, and Great Bend and south to Timken and Larned. The line is now being continued to Kinsley, and will probably be extended to towns in Edwards, Ford, Clark and Comanche counties, due to a recent discovery of a gas area in Edwards county. The entire project will cost approximately $3,000,000.

ARKANSAS NATURAL GAS AWARDS CONTRACT FOR 100-MILE LINE

Williams Brothers Contracting Company of Tulsa, Oklahoma, according to press reports has been awarded the contract for the construction of the Arkansas Natural Gas Corporation's 100-mile line from the Monroe fields to Longwood, near Shreveport.

This 20-inch line will supply additional gas to the Shreveport district through the Southern Cities Distributing Company, a unit of the Arkansas Natural. The line will also connect with the main line of the company extending to Little Rock.

At a point near Waskom a connection will be made with the Dixie Gulf Gas Company's line through which the supply of gas going to towns in Texas on the Dixie's system will be augmented.



New

High Pressure and Heavy Duty Gas Reduction

This new Fisher No. 405 Gas Pressure Regulator or reducing valve is designed and built especially for natural gas lines, stepping down their high pressures to intermediate pressures.

Handles a maximum inlet pressure of 1500 pounds—reduces to pressures of from 25 to 300 pounds. High tensile strength cast bronze bodies used on all sizes.

There are other Fisher Regulators for every type of gas control and reduction service. Ask for the Gas Catalog No. G-28.

FISHER

FISHER GOVERNOR COMPANY
2400 Fisher Building **Marshalltown, Iowa**

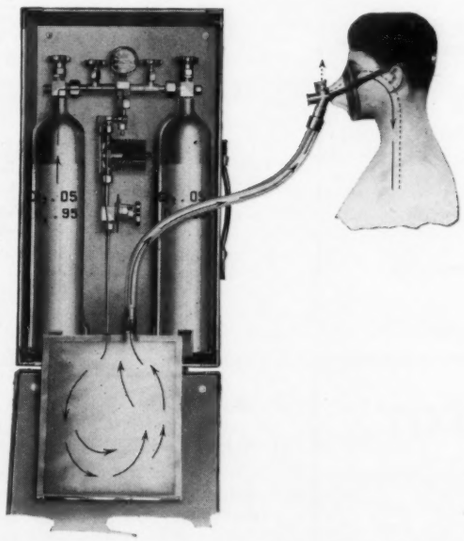


Illustration shows the flow of Carbogen from the time it leaves the cylinder until it is finally exhaled by the patient.

Write for Bulletin No. 80
PACIFIC COAST BRANCH
318 East Third St., Los Angeles, Cal.

Public Service Today Requires the Use of H-H Inhalators

The H-H Inhalator is a Resuscitation Device for administering Carbogen (95% of Oxygen and 5% Carbon Dioxide) to victims of Asphyxia from Carbon Monoxide, Gas, Smoke, Fumes and other causes.

Inhalators are being used successfully by many gas companies to create good will among customers as well as employees.

When respiration has stopped, artificial respiration by the manual prone pressure method should be employed to start spontaneous breathing. This effort should be assisted by administering Carbogen simultaneously from the H-H Inhalator.

The H-H Inhalator is a wise, good-will investment.

It is approved by the American Gas Association.

Mine Safety Appliances Co.

Braddock Ave & Thomas Blvd. Pittsburgh, Pa.

EMPIRE
Oil Meters

Positive Displacement
Oscillating Piston Type

Simple in Construction—Easy to Operate—Low in Cost of Maintenance

EMPIRE meters are highly accurate, and **stay** accurate. They are invaluable for cracking and absorption processes; for gas companies; for refiners and distributors of gasoline and all distillates of petroleum; for measurement of crude oil, cold or hot.

ALL SIZES ⅝" TO 6"

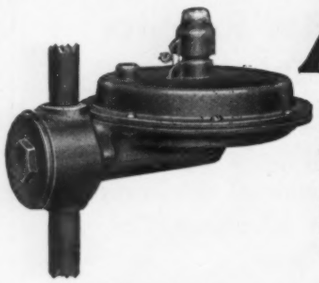
Standard meters will withstand working pressures of 150 lbs. to the square inch. High pressure types will handle 300 lbs. Higher pressures and special types to order.

National Meter Company

299 Broadway, New York

1048 Folsom Street, San Francisco — 645 Santa Fe Avenue, Los Angeles

MODEL 10 SERIES
With or Without Mercury Seal



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Also furnished in Dead Weight Type

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Gas Control Since 1892

Products for all kinds of Pressure Reduction—for either artificial or natural gas.

GOVERNORS — Intermediate Pressure, Triple Outlet, Holder, Toggle Type Street.

REGULATORS—High Pressure Service, Low Pressure Service, High Pressure Line, Single and Double District Station.

VALVE—Automatic Quick Closing Anti Vacuum.

REYNOLDS GAS REGULATOR COMPANY
Anderson, Indiana

Fire Brick Contractors

Established 1906

J. T. Thorpe & Son
Inc.

Specializing in Gas Generator, Boiler, Still and Furnace Brick, Industrial Furnaces, Retorts, Kilns, Brick Smokestacks.

A capable Engineering Department competent to advise on any problem involving firebrick construction.

San Francisco	Seattle	Portland	Los Angeles
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Classified Advertising

Classified advertising five cents per word; minimum $2.00 per insertion. Situation Wanted advertisements up to 50 words will be published three consecutive issues without charge.

HELP WANTED—MALE

Gas utility operating in Southern California desires services of engineer for research and development work on the industrial utilization of gas. Man with thorough training in mechanical or chemical engineering, with previous experience in the gas industry will be given preference. State details concerning age, training, salary, etc. Address C-17, care of *Western Gas*, 124 W. 4th Street, Los Angeles, California.

SITUATION WANTED—MALE

Manager of inter-mountain gas company with 2,000 meters desires to make change. House-heating engineer with experience as manufacturers' representative desires new position. Applicant is 34 years old, college trained, and is producing good results in present work. Can give best of references from present and past employers. Fourteen years experience. Address A-77, care of *Western Gas*, 124 West 4th Street, Los Angeles, California.

SO. COUNTIES EMPLOYEES TAKE SALESMANSHIP COURSES

Fifty salesmen and members of the staff of the Southern Counties Gas Company are enrolled in a course in salesmanship now being given by Dr. Paul Ivy in Los Angeles. This same group, with 16 other students, are also taking the course offered by the American Gas Association in the same subject.

PINE BLUFF, ARK., GRANTS PERMIT TO ARKANSAS POWER & LIGHT

The Arkansas Power and Light Company, with headquarters at Pine Bluff, Arkansas, has been granted gas franchises at McGhee and Dermott, both of which will be supplied with gas from lines tapping the Monroe-Memphis line. Searcy, Arkansas, recently granted the same company a franchise.

C. B. McKINNEY AND A. B FOSTER VISIT HAWAIIAN ISLANDS

C. B. McKinney, general manager of the Houston Pipe Line Company, and A. B. Foster, publicity manager for the same company, are spending a month in the Hawaiian Islands. With their wives, they sailed from Los Angeles aboard the S.S. "Malolo," arriving at the port of Hilo June 12.

EXTENSION OF KELSO FRANCHISE ASKED BY CHAS. COLLINS

Charles R. Collins, holder of the natural gas franchise in Longview and Kelso, Washington, has requested an extension of six months on the time limit placed when the permit was granted. June 20 was the date of expiration.

C-F is "EVERY PURPOSE" Regulation
THIS installation of a Chaplin-Fulton Low Pressure Regulator represents modern practice in safety regulation of natural gas—everywhere.
C-F Regulators of more than forty types are widely used where safety is considered quite important, and dependable operation is demanded.
Extra sensitive in response to the variations in flow, they are strong, well designed and have all the characteristics that superior workmanship has been able to create during the experience of the oldest gas regulator manufacturing organization.
Every type of C-F gas regulator is fully illustrated and described in our Catalogue and Bulletins. Present your service problem and we'll send you the correct Regulation solution.
The Chaplin-Fulton Mfg. Co.
28-40 Penn Ave., Pittsburgh, Pa.

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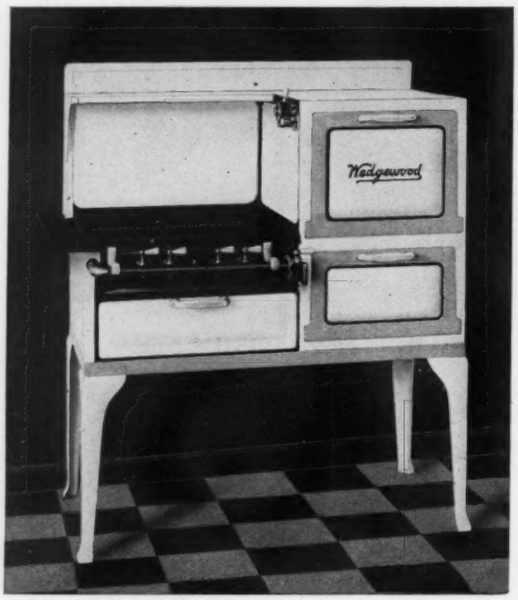
Established 1910
Analyses and tests. Represent Pittsburgh Testing Laboratory for inspection at Eastern foundries, mills and shops.
Offices & Laboratories
920 Santee St., Los Angeles
651 Howard St., San Francisco

WESTERN GAS from time to time receives requests from manufacturers asking to be put in touch with capable men or organizations in the Southwest or on the Pacific Coast who are able to effectively market their products in the western gas industry.

We also receive requests for suggestions from men or selling organizations covering the Pacific Coast as well as the Mid-Continent section, who desire to extend their activities in this industry by taking on new products or additional lines.

If we can be of service to you in this way, get in touch with any one of our three offices—**Los Angeles, 124 West Fourth Street; Dallas, 307 Thomas Bldg.; San Francisco, 447 Sutter Street.**

Wedgewood



CLOSED TOP

4-BURNER GAS STOVE

"Certainly this indispensable piece of modern kitchen equipment, with its all porcelain enamel finish, enameled oven linings and oven heat control, is a joy to cook on and take care of and more than ever at this time of the year. A model which is a special favorite with our Magazine of the Air audience is the ivory enamel trimmed in pastel green. This model lends itself to dozens of delightful color schemes and brings an air of distinction and the necessary modern note of style and color which permeates every groove of the up-to-date home."

The above is an excerpt from Ann Holden's Wedgewood Radio Talk of June 18th.

Listen In Every Tuesday—11:10 O'clock

KGO KPO
KGW KFI
KOMO KHQ

Thousands of women are getting helpful cooking suggestions from these Wedgewood Radio Cooking lessons.

JAMES GRAHAM MFG. CO.

LARGEST STOVE MANUFACTURERS IN THE WEST
COMBINATION RANGES COAL AND WOOD RANGES
GAS RANGES
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Science is now advocating the exposure of the human body to infa-red and ultra-violet rays to overcome the evil effects of a life carried on behind walls and windows, a life deprived of the vital invisible rays found in sunlight.

There is no room for doubt of the great value of these rays, and already the principle of "indoor sunlight" is understood and appreciated by great masses of the reading public.

Further investigations have disclosed that the rays from the Radiantfire with the Humphrey super-combustion burner are as similar to the rays of the sun as science can achieve.

Complete information on this subject is of momentous significance to every gas sales executive and every appliance salesman. In the May issue of the Radiantfire Magazine this data can be found, and in a pamphlet now ready for distribution "Radiant Heat for Health."

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135 Bluxome St.,
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HOW many men buy an automobile on the basis of cold dollars-and-cents' analysis of the operating service it will deliver? If a man fails to choose the most efficient car for the money, the loss is his own and he receives no censure from anyone.

But in the purchase of gas engine and compressor equipment, no man can afford to let his choice be influenced by hunches, back-slapping or spontaneous enthusiasm.

Men who turn the searchlight of analysis on operating records and actual experiences of users invariably recommend the purchase of Cooper engines and compressors. And Cooper buyers are in the majority.

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